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The development of a knowledge network framework to support knowledge mobilisation in IT project oriented change management

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RESEARCH DEGREES WITH PLYMOUTH UNIVERSITY

**The development of a knowledge network framework to support knowledge
mobilisation in IT project oriented change management**

by

Ali Alkhuraiji

A thesis submitted to Plymouth University in partial
fulfilment for the degree of
Doctor of Philosophy

Plymouth Business School

August 2017

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Dedication

To the soul of my father Ibraheem and my mother Fatimah

To my brother Abdullah, to my soulmate Lena

To my supervisors: Prof. Shaofeng, Dr. Festus & Fenio Annasingh

To the king of Saudi Arabia: Father: Salman bin Abdulaziz and The Crown Prince Mohammed Bin Salaman and to the minister of general sport authority Turki Al-alshich

Author's declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award without prior agreement of the Graduate

Sub-Committee.

Work submitted for this research degree at the Plymouth University has not formed part of any other degree either at Plymouth University or at another establishment.

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- 2- **Alkhuraiji**, A., Liu, S., Oderanti, F.O., Annansingh, F. and Pan, J., 2014. Knowledge network modelling to support decision-making for strategic intervention in IT project-oriented change management. *Journal of Decision Systems*, 23(3), pp.285-302.
- 3- Oyemomi, O., Liu, S., Neaga, I. and **Alkhuraiji**, A., 2016. How knowledge sharing and business process contribute to organizational performance: Using the fsQCA approach. *Journal of Business Research*, 69(11), pp.5222-5227.
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3. J Pan, S Liu, S Tuck and A **Alkhuraiji**, 2014. A framework for optimising inventory level of global critical knowledge to support group decision making. In proceedings of 2014 Joint International Conference between INFORMS and EWG-DSS, Lecture Notes of Business Information Processing 10-13 June 2014, Toulouse, France.
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Abstract

Although there has been rich research conducted into the interrelated issues and factors among change management (ChM), knowledge management (KM) and project management (PM), most existing studies attempt to understand the role of KM in ChM and PM in general. Given the fundamental role played by KM in supporting IT project-oriented change management, the topics of knowledge networks and mobilisation across knowledge boundaries are relatively unexplored. Recent developments in KM have heightened the need for more understanding on four main issues: 1) insufficient knowledge traceability based on the relationships between knowledge elements and key factors; 2) most decision issues in PM are related to uncertainty, complexity and implicit ambiguity, particularly with regard to systematics and interrelatedness within project decisions; 3) lack of procedural knowledge to provide strategic direction for managing multiple IT projects; 4) lack of ‘lessons learnt’ documentation in knowledge bases. To address these issues, this research attempts to analyse KM, ChM and IT project management from a more integrated perspective, and investigates the development of a change management knowledge network model (CMKNM) in IT projects to facilitate knowledge mobilisation across organizational boundaries.

The study employs a practice-based perspective by adopting both deductive and inductive approaches using an exploratory case study strategy. Empirical data were collected from semi-structured interviews and company documents. A combination of thematic analysis and comparative analysis has been employed to analyse the data collected across seven public organisations, private organisations, and international companies. Results are obtained from the empirical study on the key factors influencing knowledge mobilisation in IT project-oriented change management, knowledge networks and connections. The results identified organisational factors and their influence on knowledge channels and knowledge networks. The CMKNM allows key knowledge mobilisation factors to be aligned with each other. Connections between knowledge networks allow knowledge to be mobilised by tracing knowledge channels to support ChM decisions. The study contributes to organisational and KM theories regarding organizational strategy, organisational culture, organizational capacity, knowledge network externalities, knowledge network intermediaries, and knowledge network infrastructure.

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List of abbreviations

KM	Knowledge Management
ChM	Change Management
PM	Project Management
IT	Information Technology
PMO	Project Management Office
POOs	Project Oriented Organisations
KMob	Knowledge Mobilisation
KN	Knowledge Network
IKNs	Institutional Knowledge Networks
KNITs	Knowledge Networks of Interpretation and Translation
KNIs	Knowledge Networks of Interaction
KNFs	Knowledge Networks of Influence
ERP	Enterprise Resource Planning
IM	Information Management
IS	Information System
GBS	Governemnt Bus Service E-service

Chapter One Introduction

1.1 Research context

The literature on change management is extensive, offering different approaches to managing different types of change (Dayan et al., 2017;; Gareis, 2010; Biedenbach & Söderholm, 2008; Gareis, 2008; Todnem-By, 2005; Levy & Merry, 1986). Scholars generally perceive the change projects and programmes as a matter of organising change. Similarly, project management (PM) literature considers change as a part of projects and programmes (Gareis, 2010), which is widely executed in IT projects as a result of the misconception of change management concept in IS studies. Nevertheless, change itself is an object comprising processes and chains of processes with decision gates at the end of each process (Dayan et al., 2017; Gareis, 2010).

Misconceptions exist in the field of IS management in trying to understand the nature of IT projects to overcome inter-organisational issues of the widespread system failures (Yeo, 2002). In parallel to IS studies, project management standards (PMSs), such as the PMBoK Project Management Body of Knowledge of the Project Management Institute (2008) and Prince2 from the Office of Government Commerce (2009), refer change in IT projects as a project instead of viewing change as an object which has to be managed by defining its boundaries and dimensions (Gareis, 2010). This has resulted in (roughly 70% from 1993 to 2008) of project failures at global level (Keller & Aiken, 2009; Burnes, 2004; Kotter, 1995; Hammer & Champy, 1993). It is fundamentally important that IT community and stakeholders have a better understanding of and insights in the nature of IT projects (Ahmadi et al., 2015; Yeo, 2002).

The high speed of IT systems' developments and increasing business complexities have led to more pressure being put on global market. Modern business attempts to address their business objectives in order to implement such IT systems that exceed customer expectations and fulfil business needs. However, to introduce such systems, several researches highlight the need to encompass the technical and organisational dimensions to make them effectively implemented (Ahmadi et al., 2015; Laudon & Laudon, 2004). Thus, on-going organisational changes require precise responses for survival in an ever-changing world. Such survival depends, not only on an organisation's strategies regarding change, but more importantly on how accurately and quickly decisions can be made. This necessitates an accumulative learning process to deal with

the dynamics of different organisational levels in order to confront effectively emerging complexities.

Despite the benefits that can be achieved from successful change management programme for IT systems' operations, it has been witnessed that there is a high level of failure in IT projects intervention in various industries (Scott & Vessey, 2002). This is due to the lack of understanding full scope of the efforts required for the upcoming challenges and complexities of such intervention and changes. The degree to which modern business is attempting to implement such IT initiatives and infrastructure is coupled with increasingly business activities and complex business environment, thereby affecting organisation's readiness to change (Zeng & Skibniewski, 2013; Lehman et al., 2002). Successful IT project changes depend not only on how excellent the IT systems are, but more importantly how well the change is managed (Zeng & Skibniewski, 2013; Jorgensen et al., 2008).

The IBM which is an outsourcing global leading company in IT and business services reported that around 60% of IT projects failed to achieve their project's objectives or failed completely. The report attributes this failure to poor change management, considering that most of chief executive officers (CEOs) lack an understanding of change management in IT projects. The result of this report was drawn from 1500 practitioners from different part of the world including project leaders, stakeholders and project managers by interviews and surveys. Change management is emphasised to be the core competence in determining IT project success (Jorgensen et al., 2008).

Since the concept of Decision Support Systems (DSS) has been subsumed into the mainstream of modern business, the concept of knowledge management has evolved to influence decision making at all levels of change strategies, including the planning, implementation, post-implementation and evaluation stages. One of the most critical failure factors relates to inadequate decision-making systems as a result of the poor selection of change management strategies; this can be attributed to a lack of knowledge and poor knowledge management (Kuipers et al., 2014; Burnes, 2004; Bloodgood & Salisbury, 2001).

More recently, Knowledge management (KM) has emerged as a discrete area in organisation's studies, to enhance the utilisation of organisational assets for competitive advantage. Knowledge management and change management are widely described in the literature as being interwoven (Manhart & Thalmann, 2015; Bloodgood & Salisbury, 2001). However, organisations usually fail to address KM value within change management strategies,

considering it as a complementary concept. knowledge is not only considered as a strategic resource of knowledge-intensive economy, but also knowledge motives for change, assists in lessening uncertainty and generating readiness for change (Terry & Jimmieson, 1999). KM influences change at various levels including generating organisational readiness and organisational learning, facilitating decision making capabilities, stimulating cultural issues, promoting innovation, processing change and enhancing the overall success of change (Van Donk & Riezebos, 2005).

Recently, multi-organisational cooperation is recognised as encompassing ever-increasing demands, which in turn has resulted in significant growth in multi-organisational partnerships, whilst issues of a systematic governing intra and inter knowledge are not usually properly managed. Importantly, a knowledge management should be notably strategic in order to be effective in regards long-term success, and should be centred on momentum so as to remain sustainable (Pandey & Dutta, 2013; Walter et al., 2007). In an effort to ensure the overall effectiveness and value inherent in connections, knowledge in the specific case of multi-organisations require focus on people cooperation, well-defined policies, knowledge infrastructures, a clear knowledge path, and sound organisational structures. A number of supporting mechanisms have been introduced by advanced IT systems, with these providing new and innovative approaches to bringing people together, utilising resources from various different disciplines, accordingly linking expertise with recipients so as to ensure a network of knowledge support across different fields. Dealing with the knowledge issue is fundamental to increasing knowledge mobilisation and best utilising knowledge channels' traceability whilst simultaneously embodying collective understanding of such knowledge (Board, 2015; Parcell, 2010).

The prospect of synergies between the two areas of knowledge management and change management in IT project management makes it an attractive area for current research, exploring new approaches to mobilising knowledge across boundaries to support decision making in IT project change management. It is often recognised that the realisation of product and service development requires a core emphasis on managing the knowledge residing inside organisations. Strategically speaking, this can be achieved when knowledge exchange is assessed and pursued based on cross- boundary interchange between different organisations and departments or fields. This requires an emphasis on building a knowledge network that maintains competitiveness through the co-ordination of various parties, individuals, groups and departments.

The formation of long-term networks requires heavy input from a solid management platform in terms of moving general staff and knowledgeable specialists over conventional boundaries (Al-Jabri & Roztock, 2015; Venkitachalam & Busch, 2012; Hustad, 2004). Effectively implementing a sound knowledge network strategy and becoming a knowledge-based organisation is considered as a mandatory condition of success for organisations to manage change in their IT projects. This research proposes and validates a framework of CMKNM through empirical data that combines the effects between knowledge networks and mobilisation to enhance decision making in IT project-oriented change management. The CMKNM defines knowledge mobilisation as a dynamic process of continuous knowledge transfer, consisting of knowledge networks to connect knowledge brokering, knowledge bases, effective knowledge and knowledge seekers, while aligning key organisational factors and KM infrastructure to connect procedural knowledge to “lessons learnt” (Alkhuraiji et al., 2014).

1.2 Aim, objectives and research questions

Given the fundamental role played by knowledge management in supporting decision making in IT project change management, the literature surrounding knowledge networks and mobilisation issues, particularly in IT project-oriented change management is relatively unexplored and undeveloped. This research aims to contribute to better understanding of knowledge mobilisation and knowledge networks by developing a Change Management Knowledge Network Framework (CMKNM) in order to provide traceability and connect procedural knowledge to “lessons learnt”, to ultimately enhance decision support for strategic intervention in IT project-oriented change management.

The main objectives of this study are:

- To understand the state of the art in knowledge networks and mobilisation to support decision making in change management.
- To identify key issues and challenges of decision making in change management.
- To investigate knowledge networks and mobilisation channels through decision making process.
- To develop a conceptual framework for knowledge networks and mobilisation.
- To validate the knowledge network and mobilisation framework using empirical data collected from real IT projects through change management processes.

- To draw, from the lessons learnt, a set of recommendations that might be able to help practitioners in enhancing decision support for strategic intervention in IT project-oriented change management.

Two research questions have been formulated:

- 1- What are the key factors that influence the channels of knowledge networks and mobilisation throughout the decision making process of change management?
- 2- How can knowledge networks and mobilisation contribute to “lessons learnt” to support decision making in IT project oriented change management?

1.3 Research justification

To date, majority of existing work on the topics of change management and project management discusses four main areas. These are: 1) the characteristic and the nature of project oriented organisations and their transformations (Rebecca, 2013; Keegan et al., 2012; Huemann et al., 2007; Guest, 2002); 2) an overview about change models and approaches alongside the relation between change process, projects and programmes (Gareis, 2010); 3) the role of project managers as central players and strategic core resource in project oriented companies (Huemann et al., 2007); and 4) the role of human resource in project oriented companies (Huemann, 2010).

Knowledge management has been relatively well discussed in the literature. In relation to KM in project oriented companies, three main studies have made an attempt to explore knowledge management activities: 1) the identification of three epistemological knowledge management perspectives to examine the interaction between the most popular types of knowledge, “tacit and explicit”, for managerial practices (Christensen & Bang, 2003); 2) the identification and examination of the factors that influence the success and failure of knowledge management initiatives, but such study has not considered project oriented as a separate organisation-based change management (Ajmal et al., 2010); and 3) the optimisation of work performance by discussing knowledge life cycle in project oriented, such work does not view projects as permanent organisations. Further, such study considers organisational learning as a type of change, integrating knowledge management activities as a process of change which has to be daily improved within business activities. It discusses two types of knowledge treated as processes of “organisational learning” type of change including knowledge acquisition and knowledge storing (Gareis, 2010). Though there has been a rich research conducted in this area,

there is a need to conduct further research to offer new insights to strengthen existing findings in relation to issues of knowledge networks and mobilisations (Cooper, 2012)

Interest in knowledge mobilisation and networks in the literature has grown rapidly within different disciplines over the last decade. Knowledge mobilisation is viewed as prompting decision making by transferring the right knowledge to the right people by the right means at the right time (Levin, 2008). Most of existing work has investigated to utilise knowledge activities in two main industries, education and health, in Canada and in the UK (Cooper, 2012; Cooper et al., 2009; Davies et al., 2000). Some related work has been discussed in business sector, but does not attempt to explore the concrete concept of knowledge mobilisation and networks (Cooper, 2012).

Therefore, it is of immense importance to find out what, how and why knowledge mobilisation and networks can support decision making in IT project oriented change management. It can support the key players, such as stakeholders, vendors, knowledge holders, consultants, executives, IT specialists and ordinary users to enhance and involve their decisions in the selection of change management and knowledge management strategies at all stages of an IT project intervention.

1.4 Key contributions

This thesis has made the following key contributions:

1. It substantiated four new knowledge networks centred mainly around the classic socialisation, externalisation, combination and internalisation, SECI model. These are knowledge networks of interactions, knowledge networks of interpretations and translations, institutional knowledge networks, and knowledge networks of influence. These KNs perceive knowledge sharing as a dynamic process moving through various channels and connections.
2. The study offers insights into establishing new structured knowledge networks. A structured knowledge network framework brought significant understanding on the dynamic process of how knowledge is transferred and mobilised across boundaries to enhance the sharing, acquisition and documentation of knowledge in order to provide “lessons learnt”. Such framework allows the identified themes to be linked to their related knowledge networks

3. It developed a new knowledge network framework for innovative and implementable IT projects which facilitates the mobilisation of knowledge across organisational boundaries and knowledge channels
4. It identified, using cross-case comparisons, influential factors and sub-factors for each type of knowledge networks while highlighting the interrelationships among these factors.
5. It explored how “lessons learnt” can be communicated by connecting declarative to procedural knowledge.

1.5 The structure of the thesis

This section briefly outlines the structure of the thesis. This thesis includes eight chapters. The key elements associated with each chapter and overall thesis are illustrated in Figure 1.1.

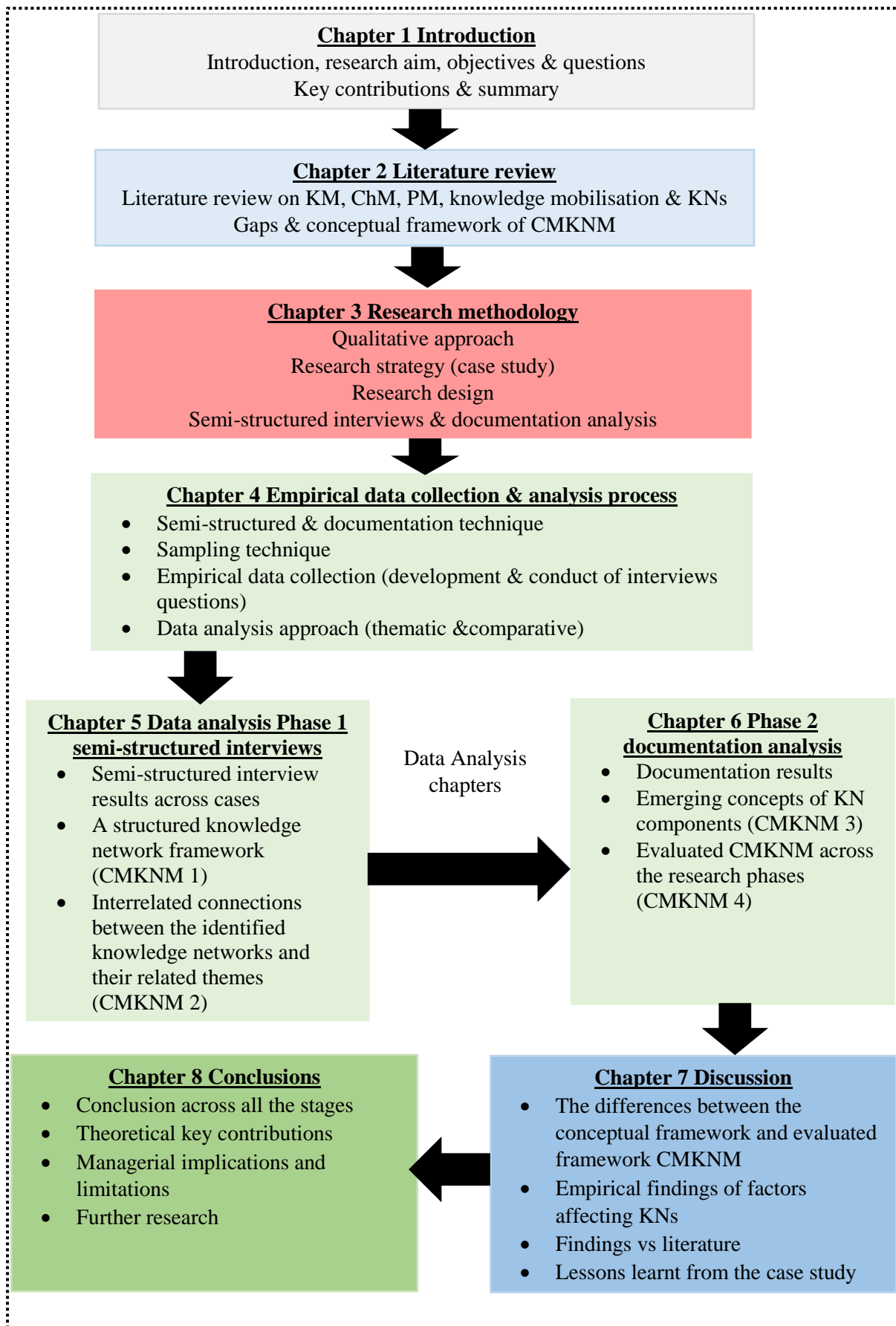


Figure 1.1: The structure of the thesis

Chapter One introduction: presents a general description of the study including the research aim, objectives and research questions. This chapter also provides the justification of the study and its key contributions.

Chapter Two literature review: discusses in detail relevant theories and key issues centred around decision making in KM, ChM, project management, IT projects, knowledge mobilisations and KNs. Gaps in the literature are identified based on the comprehensive review of literature. A conceptual framework is presented.

Chapter Three research methodology: discusses the research philosophy, qualitative research method, and case studies as a research strategy alongside justification for its use. It discusses the research design (including conducting semi-structured interviews and documentation analysis), sampling technique and criteria. Data analysis methods include thematic and comparative analysis.

Chapter Four empirical data collection & analysis process: explains the main empirical semi-structured & documentation technique, sampling technique, empirical data collection (development & conduct of interviews questions) and how data analysis approaches (thematic & comparative) were applied.

Chapter Five Evidence and findings from the analysis of semi-structured interviews: explains the main empirical findings based on the thematic analysis, explores the case comparisons, highlights the structured knowledge network framework (CMKNM 1), and explains the interrelated connections between the identified KNs and their related themes (CMKNM 1).

Chapter six Empirical findings enhanced by documentation analysis: illustrates the document analysis which was triangulated with the interviews to strengthen and validate the findings. The codes identified from the interview transcripts were applied to the documentation to find similarities and differences in core concepts. Furthermore, patterns across the results were examined to generate new concepts in the KN components (CMKNM 3). Additionally, the integrative framework of (CMKNM 4), formulated to support decision making in IT project-oriented ChM, is explained.

Chapter Seven discussion: discusses the findings of Chapters Four and Five in relation to prior research and theories presented in Chapter Two. This includes empirical findings

concerning factors affecting KNs and knowledge channels, as well as the relations between the identified factors and the literature. Key lessons learnt from this study are highlighted.

Chapter eight conclusions: outlines the conclusions across all stages, highlighting the theoretical key contributions alongside the managerial implications and limitations. Recommendations drawn from the study's results and suggestions for further research are presented.

1.6 Summary

This chapter explained the research context by highlighting the importance of understanding the nature of IT projects and the increasing complexities in the business field which have led to more pressure being put on modern business operations. Two research questions and six research objectives were formulated to achieve the aim of the research.

Additionally, this chapter justified how and why knowledge mobilisation and networks can support decision making in IT project-oriented ChM by supporting the key actors involved, offering networks to enhance their decisions in the selection of ChM and KM strategies at all stages of an IT project intervention. Key theoretical contributions which resulted from the findings of this study were outlined. Finally, the structure of the thesis is presented.

Chapter Two Literature review

2.1 Introduction

Recently KM is experiencing a paradigm shift regarding sources of competitive advantage, from economies of scale to economies of “know-how” (Sambamurthy & Subramani, 2005). Organisations are facing on-going challenges regarding collaborative learning, organisational learning, knowledge sharing and transfer across strategic alliances, and the operation of network structures, including intra- and inter-firm strategic coupling within dynamic relationships (Gupta & Polonsky, 2014). The emergence of KNs and mobilisation has facilitated further understanding of underpinning issues which help in strategic decision making to solve such challenges. To understand such challenges using a consistent approach, this chapter reviews relevant work undertaken regarding KM and ChM concepts, alongside their interrelating issues in PM. Accordingly, key issues and challenges regarding knowledge mobilisation are explored to provide insight into relationships in knowledge networks. Thus, the effects of structured KNs, which facilitate decision-making by linking procedural knowledge to experiential knowledge, are explained. Following the review, research gaps have been identified and a conceptual framework has been constructed.

2.2 KM to support ChM

KM has been recognised as a result of emergent, intellectual and societal forces. KM, at its core, could stem back to Western philosophy, which implies the need to establish understanding. The use of knowledge has been a long-standing tradition, for example, in cognitive and information sciences. The overall intricacy of knowledge has resulted in a number of triangles, for example, recognising knowledge as a practical and basic concept focused on making use of organisational objectives (Wiig, 2000). KM is also seen as a complicated concept, which centres on garnering insights into underlying processes of business to satisfy capabilities and needs.

The most widely cited definition of knowledge is probably the one originally presented by Nonaka & Takeuchi (1995): as ‘justified true belief’ and ‘a dynamic human process of justifying personal belief towards the truth’ (p. 58). In the same vein, Nickols (2000, cited in Kimiz, 2005, p. 4) states ‘the basic aim of knowledge management is to leverage knowledge to the organization’s advantage’. In the organisational domain, it is believed that knowledge is commonly classified into different types. Nonaka & Krogh (2009, p. 635) propose that there

are two types of knowledge: explicit and tacit. Choo (1998, p. 112) suggests a third type, namely knowledge culture. Comparatively, there are four types of knowledge. They are common sense, personal, proprietary, and public knowledge (Lwoga, Ngulube, & Stilwell, 2010, pp. 174–185). Considering the various classifications of knowledge, it has been widely recognised that explicit-tacit knowledge is the furthestmost common categorisation (Hislop, 2013; Nonaka & Von Krogh, 2009; Alavi & Leidner, 2001). Tacit knowledge has been regarded as one of the most important aspects warranting attention in the KM research arena (Dalkir & Liebowitz, 2011; Bouthillier & Shearer, 2002). Tacit knowledge is viewed as the experience garnered through long-term practice, maintained in the minds of its keepers, focused on making sense in how tasks should be carried out and why (Hislop, 2013; Choo, 2000). For example, individuals are naturally attracted to making decisions about how an activity can be successfully carried out and learn from such practice (Hislop, 2013; Choo 2000). Tacit knowledge may be shared through exercising, imitation, learning and observation. Tacit knowledge is seen to be a key form of knowledge and the foundation and critical underpinning of organisational knowledge (Hislop, 2013; Dalkir & Liebowitz, 2011; Bothillier & Shearer, 2002; Choo, 2000).

Explicit knowledge is created through a formal structure encompassing symbols. Such knowledge can be distributed and shared with ease (Hislop, 2013; Choo, 2000). Explicit knowledge is further categorised into two different groups, namely rule-based and object-based (Hislop, 2013; Choo 2000, pp. 395–403). Whilst the former is codified rules, routines or operating processes, the latter may be seen in a number of different elements, such as computer databases, films, prototypes, official documentation and products. Explicit knowledge is viewed as a type of intellectual commodity when possessed by an organisation (AF Ragab & Arisha, 2013; Sullivan, 1999). This form is considered as ‘the codified, tangible, or physical description of specific knowledge to which the company can assert ownership rights (AF Ragab & Arisha, 2013). Explicit knowledge is intellectual assets which are the sources of innovations that the firm commercialises. For instance, blueprints, computer programs, drawings, plans and procedures are sorts of an organisation’s intellectual assets (Hislop, 2013).

While a broader concept of knowledge was established to distinguish explicit and tacit knowledge, organisational knowledge theory has been developed to create better understanding of such knowledge, directing attention towards several important implications for organization and management theory (Nonaka & Krogh, 2009). Knowledge Creation Theory (KCT) was introduced and has been seen to have a solid foundation in the KM literature. In 1995,

organisational knowledge was identified by Nonaka & Takeuchi as a method centred on development, innovation and relating interactive knowledge with knowledge systems. KCT implementation emphasises the key role in underpinning tacit knowledge, viewed as a core of knowledge creation, which comprises a number of knowledge-related processes, including intuition, physical experiences, skills and senses of leaders. Nonaka & Takeuchi (1995) further proposed the most widely used framework of SECI, comprising four different elements, namely socialisation, externalisation, combination and internalisation of knowledge. SECI framework geared towards facilitating the transformation of knowledge from explicit to tacit and back again (Hislop, 2013; Carmeli & Waldman, 2000). Figure 2.1 provides an overview of the knowledge conversion process including how knowledge moves from tacit to explicit, and explicit to tacit.

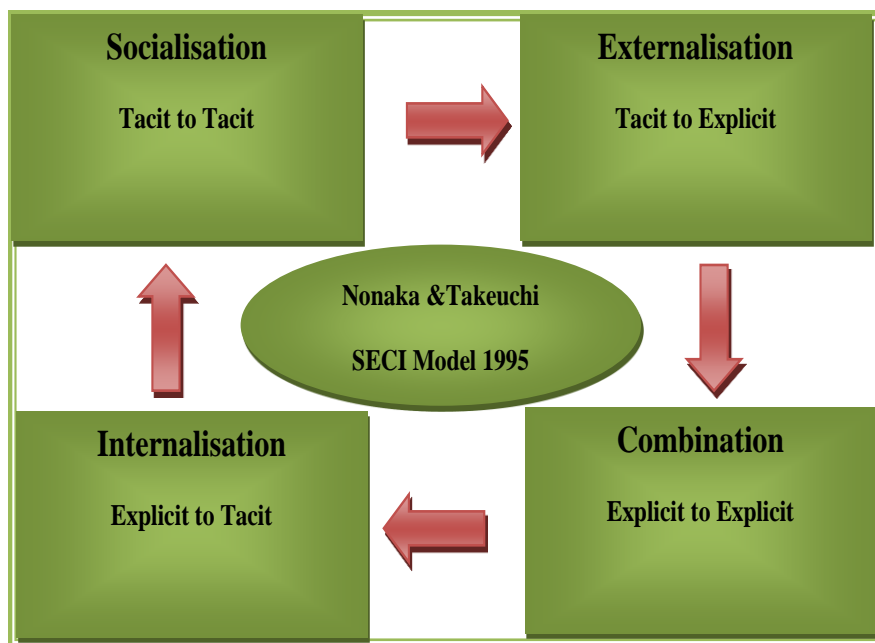


Figure 2.1: The SECI Model (Nonaka & Takeuchi, 1995, p. 91)

Through wide-range of research carried out in the field of KM, a number of approaches have been devised and applied across organisations, centred on aligning KM approaches with the functions and goals of the businesses. Firms direct their attention to the sharing of knowledge through personal interactions, educational initiatives and training, as well as knowledge dissemination (Bhatti, Larimo & Carrasco, 2016; Wiig, 2000). KM approaches overall centre on four different elements, namely people, process, enabling technology, and culture (Rathi, Given & Forcier, 2016; Choi & Lee, 2002). The instruments and strategies for KM are concerned with achieving business value, which have been considered as only effective when

achieving in-depth understanding of KM concept (Hislop, 2013; Birkinshaw & Sheehan, 2002).

On the contrary, there is some degree of consistency in the literature in regards the overall importance of Knowledge Management (KM) and Change Management (ChM) strategies in support of achieving effective decision-making. It is evident that KM and ChM connections are viewed as interwoven (Manhart & Thalmann, 2015; Bloodgood & Salisbury, 2001). Regarded as multidisciplinary fields, KM and ChM studies seek to maintain the utilisation of organisational assets for competitive gains (Kuipers et al., 2014; Birasnav, Rangenekar & Dalpati, 2011; Wiig, 2000). Business values the elusive connexion between KM and ChM in the context of multi-business firms to examine organisational capability alongside the critical role of KM strategies in supporting effective decision-making throughout all processes and phases of change. KM is proven as not only a pre-requisite and outcomes influencer, but also motivates changes, assists in lessening uncertainty and generates readiness for change (Kuipers et al., 2014; Bordia, Hobman, Jones, Gallois & Callan, 2004; Terry & Jimmieson, 1999). The dynamic power of KM is the key to edging out several inevitable issues at various level of change, including the processing and designing of change projects, spear-heading organisational readiness, supporting decision-making processes, dealing with cultural issues, and eventually enhancing the overall success of change (Van-Waveren, Oerlemans & Pretorius, 2014; Van Donk & Riezebos, 2005).

Therefore, ChM has become recognised as a critical consideration for the majority of businesses, particularly when aiming to ensure competitiveness in ever-changing, complicated business settings. Change may be identified as pivotal and somewhat challenging when considering the responsibility of management (Kuipers et al., 2014; Burnes & Jackson, 2011; Todnem, 2005). Further, change is continuous and fast-paced, neither is it expected to slow down in the near future; rather, competition is expected to progress and make its presence more in the coming years (Burnes & Jackson, 2011; Kotter, 1996). The concept of ChM is an interdisciplinary field that has been considered from a number of different viewpoints, depending on its practice or its broader meaning, but it can generally be said to be a process where the capabilities, direction and structure of a firm are frequently and consistently being renewed in terms of satisfying the needs of customers, both external and internal (Armenakis & Harris, 2009; Moran & Brightman, 2000). Furthermore, ChM is recognised as on-going and as affecting strategic and operational aspects (Burnes & Jackson, 2011; Burnes, 2004).

There are many theories on how to conduct change. Many of these theories originate from leadership, human resource and change management studies. For a better understanding of change theories, six fundamental categories have been developed to offer insights into the change process, present a common language for organisational change, evaluate the multidisciplinary research on change management, and shed light on matching and contrasting different approaches (Kezar, 2001). Kezar (2001) provides an overview of the categorisation of theories and models of change; explains each category's definition, the reasons for its occurrence, processes of change, and the strengths and weaknesses of their outcomes (see Appendix A). Such categorisation is fundamental to identifying the factors responsible for failure or success for each type of change in an increasingly global economy experiencing fast-paced change. A number of academics in the field have considered the possibility of certain factors being responsible for change project-related problems, with a number of these being recognised as associated with the change process (Pugh, 2016; Umble et al., 2003; Nah, Lau & Kuang, 2001; Al-Mashari & Zairi, 1999; Siegal et al., 1996; Tichy, 1983).

The theory of change focuses on offering various approaches for managing change whilst the actual selection of an approach is at the heart of an organisation's strategic decision making. A number of academics in the field of ChM, for example, have focused on how change can be softly managed and implemented to attain lasting benefits for organisations while selecting the most appropriate approach has become fundamentally important in studies concerning organisations. This is because around 70% of change management projects failed to achieve their goals (Aiken & Keller 2009; Burnes, 2004; Kotter, 1995; Hammer & Champy, 1993), leading to concern among scholars and practitioners trying to find the most appropriate approach and strategy to adopt. Scholars argue that instead of looking at the main fundamental approaches of ChM (the planned and emergent approaches) as rivals, these can be complementary; thus, an organisation should seek the approach that can be softly adapted to best suit its context (Burnes & Jackson, 2011; Burnes, 2004).

Despite there being various approaches used in organisational change, there is general agreement in the literature that there are two dominant approaches: planned and emergent (Burnes & Jackson, 2011; Burnes, 2004a; Burnes, 2004b; Stace & Dunphy, 2001; Weick, 2000; Dawson, 1994). Planned change clearly highlights the current situation and the future state (what is desirable) alongside the processes, steps, stages and phases of how to reach the desired state (Burnes, 2004a; Burnes, 2004b). Despite the dominance of the planned approach, certain criticisms of the approach focus on the complex and dynamic nature of change in real-time as

this involves various unpredictable factors (Burnes, 2004a). This dynamic nature of on-going change in modern organisations supports the concept of emergent change. The emergent approach deals with contingencies, breakdowns and opportunities in everyday work where activities cannot be easily planned (Burnes & Jackson, 2011; Weick, 2000).

Regardless of the fact that the organisational perspective is recognised as being one of the most complicated, change in this domain has not been well defined in the literature. Although Organisational change management (ORChM) as a concept has been acknowledged for many years, there is still a notable overlap between definitions of change, as well as the organisational change contexts (Christensen et al., 2007). With this in mind, a number of attempts have been made towards providing a definition (Jarbandhan, 2012, p. 36; Christensen et al., 2007, p. 218; Sergiovanni & Corbally, 1986, p. 67). Some studies have related organisational changes to behavioural and leadership perspectives, emphasising six prominent issues: namely, resisting change, coping with change, responding to change, accepting change, bringing forth change (increasing creativity in changing circumstances), and mastering change (innovation). Importantly, all of these may be associated with different aspects of organisational change, with some being linked to external factors such as ‘new technology, changes in the market place, competitive environment and other external activities’, whilst others are internal: e.g., culture, internal systems, organisational structure, policy and strategy (Steiger et al., 2014; Kitchen & Daly, 2002; Gilgeous, 1997). This emphasises the view that change management is not an individual discipline with clearly outlined boundaries, but rather a practice and theory that is much influenced by the traditions and disciplines of social science (Steiger et al., 2014; Kitchen & Daly, 2002). In line with the above, it has also been recognised that, all too often, change may be viewed as going hand-in-hand with growth, with organisational change methods generally seen to involve widespread employee involvement with the aim of ensuring agreement amongst the individuals and entities involved (Mishra et al., 2014; Dunphy et al., 1988, p. 317).

It is common for the parties involved and affected by the change to be stimulated by both internal and external forces; this requires that the set of processes should be managed in a controlled and systematic way to ensure the successful adoption and application of the change. In this regard, prior works focusing on ChM have emphasised the need for the human aspects of the business to be well aligned with strategic movements in the firm in order to ensure that the firm's aims and objectives are achieved. This may be achieved through the adoption of both personal power-related political and institutional manoeuvres, the imposition of chief executives, or otherwise by outsourcing (Mishra et al., 2014; Kitchen & Daly, 2002; Dunphy et al., 1988). Such different types of change in the organisational domain may or may not be consistently applied; thus, change may be gradual and may pass through different stages, allowing businesses to utilise plans and strategies that fall into the proactive future-oriented change arena (Bull & Brown, 2012; Gaddis, 1997, p. 40). In contrast, change that is discontinued may be more difficult to plan owing to its lack of clarity. This type of change commonly occurs without much recognition (Allen, 2009; Golembiewski, 2000). Essentially, the degree to which a course of action may be warranted by changes runs parallel with the extent of a firm's fundamental characteristics and functions, as well as how such changes may be implemented (Wright, 1997). A firm's natural tendencies essentially underpin the strategy for change. Accordingly, different reasons have been highlighted as being demonstrative of change. These include environmental factors, desire for change, performance optimisation, long-term objectives, and general discontentment. These and other causes of change tend to be linked to five key change categories: change in equipment, plant and tools; change in formal organisational structure; change in informal groups in terms of influencing people; changes in staff; and changes in systems and operating procedures (Allen, 2009; Wright, 2005).

One of the most essential aspects of organisational change is culture (Waddell et al., 2013). Culture as a term is recognised as comprising group norms, attitudes and climate (Lewin et al., 1939). An alternative definition was provided by Schein (1985). This outlines culture as:

‘(a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new members as the (f) correct way to perceive, think, and feel in relation to those problems’ (Schein, 1990, p. 111).

In addition to the above, Schein (1990, p. 101) suggests that a culture encompasses three critical levels: (1) observable artefacts, (2) values and (3) basic underlying assumptions. It is further recognised that culture may be viewed as a number of life tasks, and thus can be viewed as the learned response to such tasks. Moreover, culture is regarded as a dynamic learning process in a group, which then is developed through consensus in terms of values and beliefs. Nonetheless, the term ‘culture’ was distinguished from the change perspective (Frost et al., 1996). With culture having previously been recognised as an organisation-wide value, these scholars presented instead a set of homogeneous and unifying values. Thus, organisational culture was defined by Wilson (2001, pp. 253–259) as relating to the beliefs, perceptions and values held and shared by business staff. Much attention has been directed towards organisations and their success or failure, defining their image and influencing their scope. The culture of human relations is regarded as either centred on easing the change process, or as creating an obstacle to such, as well as affecting human behaviour, diversification and beliefs, countries and ethnicities (Vargas-Hernández & Noruzi, 2009; Chuang et al., 2004). Culture is playing a key role in decision-making, strategies and implementation stages throughout the change management programme. Some common issues such as resistance to change and conflicts are fundamental in the decision-making process, as well as establishing the overall structure of decisions (Briley et al., 2000). Cultural aspects are regarded as pivotal in relation to decision-making in change management programmes (Waddell et al., 2013; Kanungo, 2007).

Various advocates of ChM have devised and introduced a critical research programme which centres on the human relations in a firm’s context (Cameron & Green, 2015; Likert, 1947). Throughout the literature, there has been much recognition that behavioural science and human relation studies are associated with the change process (Cameron & Green, 2015). A number of other works have examined leading global examples of IT-enabled change, which view culture as a fundamental ingredient in ChM studies and the overall organisational structure (Papachristos, 2014; Iveroth, 2010). Regardless of the fact that IT is recognised as one of the key change agents in the field of modern-day business, it remains as one of the most valuable change drivers (Pollard, 2010; Mitropoulos & Tatum, 2000).

The extent to which modern business seeks to make use of tools and initiatives in the IT arena may run alongside an increasingly complicated business environment and ever-more complex business activities. This subsequently affects the overall position of the organisation with regard to change (Amis & Aïssaoui, 2013; Lehman et al., 2002). With this noted, it is

emphasised that strategic change stems, not only from environmental changes and technological interventions, but also intra-organisational constituencies and their interests (Amis & Aïssaoui, 2013; Boeker, 1989, p. 510). Essentially, this may place emphasis on intra-organisational considerations and problems and their impact on change from an IT-related standpoint. One such consideration is that of the organisation's structure, where new technology needs to be linked to this structure across all domains, facilitating relationships between causes and outcomes, whether the structure is casual and logical, or analytical (Botha, Kourie & Snyman, 2014; Markus & Robey, 1988). A further issue is that organisational culture is able to establish the success or failure of an IT change project (Pollard et al., 2010). This is an area that receives further attention in subsequent sections.

A number of other considerations are linked to financial, human, organisational, political and technical factors. Such issues, in their most wide-ranging form, can potentially be categorised in relation to managerial and organisational perspectives, and the actual function of an IS development project (Savolainen et al., 2012; Yeo, 2002). According to Yeo (2002), a number of factors are relevant regarding change in the IT arena. These include: an unsuitable reporting structure, vested interests, poor dedication of management, organisational culture, political forces and influences. Moreover, Yeo (2002) and Savolainen et al., (2012) state that fundamental influencing factors in how projects are managed include: pre-occupation with technology in the planning of projects, human relations focus, a disregard of complexity, a lack of stakeholder management, inadequate consultation, poor committee design, technical fixes for management problems, inadequate competence in the management of projects and the project team, and poor decision-making. With this noted, recent issues in the IT change arena, on the other hand, are seen to be linked with decision-making in terms of change process methods (particularly in terms of aligning IT and business objectives), as well as with regard to the overall ability of a firm to adopt changes concerning its organisational and IT-specific capacity (Huang et al., 2013; Thomas, 2012; Khan, 2012; Shipton et al., 2012; Judge & Elenkov, 2005). When considering the capacity of a firm, this may include individual and organisational level skills, system complexity, usability, coaching, future development, resource accessibility, training courses, monitoring, and the availability of financial support. It is necessary to consider issues such as these and more if a change strategy is to be well judged, chosen and implemented, thereby improving decision-making and work performance (Heckmann et al., 2016; Judge & Elenkov, 2005).

In an organisation's ChM programme, project management plays a key role and encompasses a number of different human activities; as such, it is at the heart of an organisation's structure. Importantly, this has resulted in factors being established that both embrace and enhance processes and systems across the firm, whether in terms of strategic orientation, evaluation, project planning or HR management (Pemsel et al., 2014; Huemann, Keegan & Turner, 2007). However, it is common for such change to be affected by both internal and external forces, as well as various unpredicted factors that may appear during the change. Therefore, there is a need for a more wide-ranging and comprehensive approach to change strategy, either via the emergent or the planned method, with the goal of maximising the project's success (Petrovic et al., 2014).

Regardless of the fact that the term of project oriented organisation is a relatively new element in the ChM field, project-orientation characteristics facilitate the inclusion of various functionalities and activities. These may be linked with the attraction and efficiency of staff, process orientations, organisational structure, customer orientations, organisational change, top management, and organisational networks. Accordingly, sound skills are required by different parties, whether individuals, project teams, or the organisation as a whole (Pemsel et al., 2014; Rebecca, 2013; Huemann et al., 2007; Guest, 2002).

In project-oriented companies, HR management is critical (Petrović et al., 2014; Heumann et al., 2007) with HR managers recognised as responsible for and well-suited to rewarding, networking and leading change (Manning & Sydow, 2008). The systematic literature review of project management revealed interactions between the project management's competences, project managers, the project management team, knowledge and experience, and project management models (Heumann et al., 2007; Gareis & Hueman, 2000). However, the project orientation literature has been found to be lacking in relevance and value concerning issues pertaining specifically to KM; rather, the importance of experience and knowledge sharing has been addressed (Ruuska & Vartiainen, 2013). One issue where there is a lack of practical research in the KM literature is association with the mobilisation of knowledge (Tymensen, 2015; Rodway, 2015; Levin, 2008). In a comparable vein, when seeking to deal with the key factors inherent in project-oriented firms, one key factor is the project portfolio. This mainly focuses on managing ongoing projects but issues concerning this seem to be lacking as most project-oriented studies have been completed with a focus on growth, organisational decline and organisational maturity (Al-Haddad & Kotnour, 2015; Gareis & Hueman, 2000; Levy & Merry, 1986).

Thus, in line with the study's aim, consideration was given to devising a conceptual framework from the literature findings, as will be discussed in Section 2.7. The framework focuses on the integration of ChM and KM to facilitate KMob through KNs and knowledge channels to provide traceability and connect procedural knowledge to “lessons learnt”, to ultimately enhance decision support. Extracting the key findings concerning both terms, whilst ensuring emphasis is placed on IT project orientation, necessitates attention being paid to organisational culture, organisational capacity, organisational strategy and knowledge infrastructure. Importantly, these also warrant alignment with various other aspects, namely, organisational assets, project teams and individuals. Accordingly, the key actors have a crucial role to play in terms of networking with departments and divisions, i.e. with intra- and extra-organisational networks (Gupta & Polonsky, 2014).

With the above mentioned in mind, the interest in IT projects global outsourcing has been growing significantly as a strategic approach in modern organisations in a transitional economy (Gupta & Polonsky, 2014). This comes as a result of unavoidable pressure derived from technological change that requires skilled employees, advance tools, experts, and the promotion of skills across economies (Gupta & Polonsky, 2014). Such pressure in managing IT projects has been shifted from central decision-making to wider involvement in such decisions to maximise the overall success of IT projects (Eweje et al., 2012). Both intra and inter organisational relationships have been restructured to accompany advanced working practices across related sectors as a form of strategic collaboration (Gupta & Polonsky, 2014). Parallel to research theoretical and practical developments on outsourcing strategies, organisational and managerial practices have faced various complex issues in dealing with strategic collaboration as a form of joint ventures, policies agreements, contracts, technical exchanges, and research and development networks. Such issues include—but are not limited to—collaborative learning, organisational learning and sharing knowledge in strategic alliances, the operation of network structures, and intra and inter firms' strategic coupling within dynamic relationships (Gupta & Polonsky, 2014).

Any instability recognised in the business environment warrants the attention of organisations to be directed towards resource acquisition and utilisation, such as in regard to workforce skill and management experience (Manhart & Thalmann, 2015; Bloodgood & Salisbury, 2001). Essentially, business instability may be caused by different factors—notably referred to as driving forces—with some occurring at the desire of the firm whilst others are more forced. When considering both KM and ChM, these have a high degree of similarity, which therefore

directs attention to the interlinks between the two fields. Table.2.1 provides a comparison of the terms in consideration to their drivers.

Table 2.1: Comparison of KM and ChM drivers.

	The drivers of ChM	The drivers of KM
Internal drivers	1- Information technology intervention (Mitropoulos & Tatum, 2000). 2- Organisational disorder. 3- Strategic orientation. 4- Institutional requirements (Mitropoulos & Tatum, 2000). 5- Managerial positioning. 6- Restructuring 7- Cultural aspects	1- Blockages in enterprise effectiveness (information need to be flown throughout organisation). 2- Increased technological capabilities. 3- Understanding of human cognitive functions (Wiig, 2000). 4- Information overloads (Quintas, Lefrere & Jones, 1997). 5- Loss of business core values 6- Cultural aspects.
External drivers	1- Globalisation of business and competitive advantages. 2- Opportunities. 3- Natural forces. 4- Governmental policy. 5- Diversification. 6- Customers need and demand. 7- Market needs. 8- Cultural aspects.	1- Globalization of business and international competition. 2- Sophisticated competitors. 3- Sophisticated Suppliers (Wiig, 2000). 4- Markets new need and demand. 5- Cultural aspects

A key aspect of KM is its ability to maintain a variety of organisational functionalities, including work performance, decision-making, social cognition and strategic management (Van Donk & Riezebos, 2005). Whilst ChM strategy is centred on employing the KM strategy as a key for achieving the effective utilisation of numerous important resources, the key competencies of organisations are built upon employees' experiences and skills, thus highlighting the need to identify ways of tapping into such knowledge so as to develop and maintain core capabilities (Ruuska & Vartiainen, 2013; Gareis & Hueman, 2000). Maintaining core capabilities in dealing with on-going business issues is the central strategic business strengths to not only utilise existing knowledge, but also to create new knowledge and find ways to support decision-making. A poor decision-making system is always apparent within the poor selection of change management strategies; this can be attributed to a lack of knowledge and poor knowledge management (Bloodgood & Salisbury, 2001; Burnes, 2004a). With this in mind, it is evident that KM and ChM strategies continuously call for new

approaches to supporting decision-making in dealing with on-going organisational issues (Kuipers et al., 2014; Cao, 2010; Cao & McHugh, 2005).

Existing work on ChM discusses the specific characteristics of project-oriented companies and their transformation, change models and approaches, the relation between change processes, projects and programmes, and the role of human resources in project management (Rebecca, 2013; Keegan et al., 2012; Gareis, 2010). Some theoretical work has come across knowledge management and the role of project managers as a strategic core resource in project-oriented companies (Huemann et al., 2007; Keegan et al., 2012). In this light, three epistemological knowledge management perspectives have been identified in project-oriented organisations: (1) examining the interaction between tacit and explicit knowledge for managerial practices (Akbar & Mandurah, S., 2014; Christensen & Bang, 2003); (2) identifying and examining factors that influence the success or failure of knowledge management initiatives in project-based companies (Ajmal et al., 2010); and (3) examining the key problems in embedding new management knowledge within processes of change (Todorović et al., 2015; Bresnen et al., 2004).

Generally, there has been rich research conducted into the interrelated issues and factors among ChM, KM, project management and IT project management, existing studies attempt to understand the role of KM in ChM and IT PM (see section 2.5 for more details), (Svejvig & Andersen, 2015; Tranfield et al., 2003). In the light of KM, organisational learning is viewed as a form of change across two processes, namely gaining new knowledge and stabilising new knowledge (Gareis, 2010). The different phases inherent in each of these processes have their own individual mechanisms and tools. Moreover, organisational learning needs to progress through continuous improvement through daily business activities so as to encourage innovation within and across any firm (Gareis, 2010). Essentially, further work needs to be carried out on a systematic approach to project-oriented change management, and how this is practiced, where such is driven through the application of KM; this may go hand-in-hand with existing ChM strategy in an effort to further facilitate and support decision-making processes. Importantly, thus far, very little research has been carried out in the field of KM in project-oriented organisations including the devising, sharing and adoption of knowledge in regards performance optimisation in project management (Lindner & Wald, 2011; Love et al., 2005). Nonetheless, such work does not consider projects as permanent firms nor does it take into account issues relating to KMob and KNs to enhance decision-making mechanisms.

2.3 Evaluation of knowledge mobilisation theories

In recent years, there has been an increasing interest in knowledge mobilisation (KMob). More recently, literature has emerged that offers contradictory findings about knowledge mobilisation. This is probably resulted from a lack of consensus concerning knowledge management terminology; a lack of agreement regarding knowledge management issues, resulting in multiplicity of conceptual frameworks; and because knowledge management is multidisciplinary, extending across a range of academic fields and sectors. Thus, knowledge mobilisation has been viewed from three main perspectives, health, educational and business.

The first view on KMob is from educational perspectives. It is viewed as a combination of knowledge processes of the transfer, dissemination and translation of knowledge (Cooper & Levin, 2010; Cooper et al., 2009; Davies et al., 2000). This definition has been derived from an epistemological standpoint towards the role of knowledge mobilisation in supporting education in Canada by the Research Supporting Practice in Education (RSPE) program at OISE/University of Toronto to develop educational knowledge networks (Levin, 2008). However, this definition is centred around the process of knowledge sharing in knowledge management literature, so it does not bring an insight into the meaning of knowledge mobilisation. Instead, it illustrates the overlapping concepts in the literature that cause confusion regarding knowledge management categories (Neal, 2015; Gould & Powell, 2004; Huang et al., 2001). It has been also viewed to influence decision making by transferring the right knowledge to the right people by the right means at the right time (Levin, 2008). Nevertheless, this definition refers to the transfer of information rather than knowledge, another overlap between the two fields of information and knowledge. One major theoretical issue that has dominated the field for many years' concerns referring to knowledge as information although the definition emphasises their influence in decision making.

The second view is from health industry from Canadian Institute of Health Research (CIHR). It refers knowledge mobilisation to on-going dynamic process including the synthesis, diffusion and exchange of knowledge to create effective healthcare systems (Gagnon, 2011). Nonetheless, this definition was mostly focus on knowledge translation, thereby neglecting issues of knowledge creation which is a major discussed topic in KM literature (Nonaka & Takeuchi, 1995). This is possibly because of the specific purpose of this definition to support certain criteria within healthcare systems. Further, external, inter-organisational issues and knowledge were excluded from this definition, though they play a fundamental role in formulating knowledge management strategies (Neal, 2015; Gould & Powell, 2004).

The third view from business is dealt with the role of knowledge brokering and intermediaries concerning innovation in a corporate business environment. However, the purpose of this view is to raise connections between research, policy and practice in public services in Canada. This study was conducted in 44 Canadian knowledge management third parties in business (Cooper, 2012). Although this study attempts to bring about rich insights into much related work in knowledge mobilisation, there seems to be some avoidance to define and outline the concept comprehensively.

While a number of definitions for KMob have been suggested, this work will consider the most related three views which are consistent with the aim of this research. Firstly, knowledge mobilisation is a multifaceted process incorporating collective knowledge, ideas and concepts used to take action to meet certain objectives (Levesque & Works, 2010). This view highlights three fundamental components for decision support which are: 1) Knowledge gathering process regarding a specific issue as an input; 2) the process of analysing and making decisions; and 3) the evaluation of outputs. This is particularly important in IT projects since the objectives have to be met within time, budget and quality. Secondly, KMob is related to addressing external knowledge to combine it with the existing one to create and facilitate new knowledge (Neal, 2015; Creech, 2004). This view highlights the importance of evaluating external environments to employ such knowledge into an organisation's advantages to create new knowledge. Such evaluation needs to connect various parties including people and systems. The final view brings insights into how to connect between people, organisations resources, culture and the community of practice which can be called organisation's network of intellectual assets (Naidorf, 2014; Jashapara, 2011). This definition though came about an interesting area of research about organisation's network of intellectual assets, but lacks a proper explanation into the meaning of KMob.

The above mentioned definitions provide three components in trying to have a better view into the meaning of knowledge mobilisation. These are internal knowledge network, incorporating knowledge network and organisations' network of intellectual assets. In the next sections, these components will be further examined.

2.4 Evaluation of previous studies on knowledge networks

2.4.1 The concept of knowledge networks

The literature of KMob implicitly highlights different terms in attempting to explain the interaction between context, systems and group. For example, the role of "organisation's

network of intellectual assets” is a key to mobilising internal knowledge (Neal, 2015; Naidorf, 2014; Jashapara, 2011). Further, such work highlights the “connections” between knowledge resources and activities to innovate new knowledge (Morente-Molinera et al., 2016; Creech, 2004). Knowledge has to be utilised and put into actions to be available as “actionable knowledge” (Levesque & Works, 2010). Knowledge can be mobilised by identifying “linkages” between patterns of interests (Levin, 2008). Finally, the term of “knowledge brokering and intermediaries” has been widely practiced in traditional ways such as third parties, vendors, and outsourcing services and so forth (Neal, 2015; Cooper, 2010).

These terms of networks, connections, linkages, actions, brokering and intermediaries have to be systematically addressed to achieve a better overview into the meaning of knowledge mobilisation. Further, it is substantially important to come cross aspects involved in knowledge mobilisation or knowledge networks activities. For instance, there are concerns towards the differences between organisational culture and organisational climate, what knowledge management strategies can fit within certain organisational culture and how to build communities of practice, how knowledge management technology can be embedded to achieve a desired culture, issues regarding cultural typologies and their impact on knowledge sharing (techniques and strategies), issues of intellectual capital and the role of management in humanizing a community of practice; and finally how to utilise certain aspects of knowledge management to mobilise change (Neal, 2015; Jashapra, 2011; Hislop et al., 2000).

This combination of aspects and activities provides some support for the conceptual premise that there are common inevitable factors influencing knowledge networks in IT projects. For example, knowledge networks are influenced by the type of structure, and the power of authority and political involvement (Hislop et al., 2000). Prior studies that have noted the importance of considering several issues in order to construct networks such as political factors, the level of authority, organisational structure, organisational culture, technological maturity (Muller, 2017). These factors may explain the correlation between building knowledge networks and connecting variety of organisation’s assets such as knowledge, experience and lessons learnt in order to mobilise knowledge. Such mobilisation may solve variety of issues during IT project intervention such as resistance to change and its cultural, technological, political and structural issues. Another possible explanation is that some intangible knowledge remains undiscovered and unvalued, which confirms that tacit knowledge (or “know how”) and networks are inextricably inter-related (Hislop et al., 2000).

2.4.2 Importance of understanding relationships in knowledge networks

Formal knowledge networks are typically comprised of knowledgeable specialists who are interested in the same issues. These members are focused on increasing their knowledge in a certain area in order to identify ways to address and overcome specific issues or problems (Hislop, 2013; Creech, 2004). The overall goal of those studying knowledge networks in IT project issues is to ensure that suppliers and staff are able to understand and integrate facts into their companies' products, policies and processes (Lomas, 2007). According to the existing literature, the relationship between factors both within and outside of the organisation must be recognised if knowledge networks are to be able to facilitate KMob for strategic decision-making as part of IT projects. Specific factors include knowledge management infrastructure, organisational capacity, organisational culture and organisational strategy. Examples of knowledge management infrastructure include knowledge management strategies and methods, whilst organisational capacity includes factors such as the organisation's resources and readiness. Organisational culture includes elements such as leadership, incentive schemes, trust, collaboration, behaviour, community of practice, and so on. Finally, organisational strategy can include political factors, policy, processes, organisational structure and strategic orientation, amongst other components as outlined by Alkhuraiji et al. (2014) and Nielson (2005).

Scholars explain, the term "network", in the context of creating strategic knowledge networks, is often used to represent the mediators, brokering, actions, relationships and connections that must be considered (Hislop, 2013; Jashapra, 2011; Hislop et al., 2000). Researchers also highlight the increase in attention paid to the treatment of knowledge acquisition, achievement, formulation and sharing as a key asset (Mehta et al., 2014; Sambamurthy & Subramani, 2005; Takeishi, 2002; Teece et al., 1997). Therefore, companies must ensure that they are able to both leverage knowledge already obtained whilst also focusing on identifying new sources of knowledge as part of their strategic decision-making activity if they are to succeed and outperform the competition in the long run (Erden et al., 2014). Companies' knowledge networks can be analysed to determine the relationships that exist both within each company and between one company and others. This is due to the movement away from the emphasis on economies of scale as a source of competitive advantage towards the knowledge-based economies (Mehta et al., 2014; Sambamurthy & Subramani, 2005).

Knowledge networks are especially significant in innovation system markets. These markets share knowledge (and the intellectual property rights linked to that knowledge) via influential actors which serve as links between various infrastructures, networks, social connections, procedures, institutions and systems. An OECD (2013) report asserts that knowledge exchange is supported by knowledge networks and markets (KNMs) as they deliver various essential services (e.g. knowledge-related agreement enforcement, implementation, review and proposals) and help to identify and bring together knowledgeable parties. An organisation's ability to acquire knowledge is greatly impacted by the identification and assessment of a network's boundary spanning, from which sound knowledge networks can then be created. With adequate support from management and an effective structure in place, this allows organisations to obtain significant advantages (Trippel, 2013).

2.4.3 Effects of structured relations in knowledge networks

Internal and external knowledge networks fall under either the delivery of network category or enabling network category, with the former emphasising on added value and the latter facilitating greater organisational capacity (Seufert et al., 1999). Thus, knowledge transfer can be greatly influenced by structured knowledge networks, which serve as an inexpensive support system for knowledge exchange (Irani et al., 2014; Reagans & McEvily, 2003). The level of expense involved in knowledge transfer decreases in line with insights into the knowledge possessed by the source. However, a lack of connection between internal departments within the organisation and the outside knowledge sources results in the inability to access certain areas of knowledge. The main purpose of a structured knowledge network is to facilitate decision-making by linking procedural knowledge to experiential knowledge (Alkhuraiji et al., 2014). the main emphases of structured relations include recording such developments and ensuring that they are clearly linked, the arise of the association with innovation, new knowledge dissemination, the alignment of such developments with actual knowledge creation, and the ways in which the knowledge network is associated with its development stage in practice (Gil & Mataveli, 2016; Etemad & Lee, 2003). Although knowledge networks typically emerge as a consequence of specific conditions, it is essential to tackle their effectiveness, governance, structure, efficiency, sustainability and resource availability (Tzortzaki & Mihiotis, 2014; Creech, 2004).

The IS and KM literature published over the last 20 years highlights four key theoretical perspectives on the conceptualisation of issues between organisations: process theory, system theory, network theory, and actor network theory (Olsen et al. 2014; Hutzschenreuter &

Horstkotte, 2010; Welch et al., 2005; Blackler et al., 2000). Such research explains that process theory offers a knowledge creation process model that is linked to actor network theory, whilst system theory emphasises the relationships between departments and the corporate setting in which they operate, and network theory emphasises the dynamic and structural nature of these relationships. The dyadic connection in knowledge network activities is considered to be reciprocal, with equal abilities to influence certain elements (Olsen et al., 2014). These relationships are typically managed and carried out in order to realise group benefits through the activities of the organisation, which helps the organisation to connect to knowledge sources in order to minimise the cost of acquiring knowledge whilst also improving its market position. Efficient knowledge networks focus on strengthening the relationship between policy makers and knowledge producers. This helps to create policy that is based on knowledge practices such as analysis, insights, research and conceptualisations. The benefit of this is to create greater partnership with market forces in order to benefit knowledge producers (James & Jorgensen, 2009).

However, Actor network theory (ANT) has been employed in information system (IS) research in order to gain insights into the multifaceted socio-technical problems related to IT projects. ANT outlines the relations between network actors and demonstrates the ways in which these actors are linked through the use of artifacts, which are non-human actors, to create greater opportunities for connections in order to meet shared interests (Venkitachalam & Busch, 2012; Mahring et al., 2004). ANT therefore emphasises the way in which social processes are influenced by non-living entities. Here, the actor – whether human or not – is considered the main point of an action, and technology is considered to have arisen out of social interest, having the ability to determine social interaction. Ontologically and epistemologically of ANT views the world as being driven and determined by networks comprised of actors. These actors can be ideas, concepts, physical objects or individuals. Here, it is proposed that all things are created through events arising from shared interests. ANT is concerned with the study of the origin of networks, their structure, the way in which they interact with each other, and the ways in which actors are integrated into them. IS research applies ANT to explore organisations' technological integrations, which primarily impact entire organisational networks. Under ANT, mediators and intermediaries are differentiated based on their related outputs. Specifically, mediators convert inputs into irregular outputs whilst intermediaries' outputs are easily forecasted based on their inputs. This is an essential differentiation with respect to the outcomes of social issues, which tend to be unpredictable. Therefore, it is necessary to investigate the

ways in which local networks are created, altered and structured. ANT effectively provides insights into how social networks are created through technology in line with its multi-layered perspectives on important actors through the commencement of a sophisticated IT project. ANT has been applied in much of the IS research in order to evaluate and understand the political processes involved in IT integration (Venkitachalam & Busch, 2012; Cresswell et al., 2010). Project objectives determine decision makers' actions based on project factors, experiences, examples and specific details. Finally, as per the work of Mahrting, Holmstrom, Keil and Montealegre (2004), this research adopts ANT concept to gain insights into the creation and structure of knowledge networks, the outcomes of their creation, and the challenges associated with their creation.

2.5 In-depth evaluation of KM, ChM, PM, KMob and KNs previous studies

Identifying a new body of knowledge requires a systematic review and critical analysis of existing studies' findings (Svejvig & Andersen, 2015; Tranfield et al., 2003). A number of criteria establish such systematic reviewing and these include, but are not limited to: framing questions for the study review; using key words to identify relevant work (e.g. web-based articles, text books and books); assessing the quality of studies by a publication's popularity and number of citations; summarising the evidence; and interpreting the findings (Tranfield et al., 2003).

Most existing research into ChM in the area of KM concerns identifying factors associated with knowledge creation and sharing to assess and contribute to an organisation's readiness for change (Taylor & Wright, 2004). Other works offer change management models and theories, including communication issues during change projects, leadership, and employees' engagement and commitment (Makumbe, 2016). Although the theory of ChM alongside its relevance to KM activities has been a focal point of discussion over the past decades, it lacks empirical exploratory work which increases the knowledge of organisational change management (Kuipers et al., 2014; Todnem, 2005). In this vein, most existing research on project management that focuses on knowledge management sheds light on issues regarding knowledge sharing; it is rare that there is a focus on the project portfolio as a knowledge repository. In essence, the project management literature is still lacking empirical research to examine organisational and operational issues derived from the knowledge management related fields (Burke, 2013). As a result, there has been a shift in practice towards focusing on value creation instead of product creation, paying attention to intellectual rather than capital

assets, increasing the challenge of linking business strategy to projects, satisfying business needs and benefiting the stakeholders involved (Williams & Samset, 2010).

Project-oriented organisations, as an emerging field is distinctive from project management, explains issues related to knowledge management from two aspects: the project portfolio and knowledge transfer issues (Huemann et al., 2007). Some recent trends in the analysis of issues regarding project management from the perspective cross disciplines suggests that decision making, in terms of change process methods, is the focal point of discussion (Svejvig & Andersen, 2015; Huang et al., 2012; Thomas, 2012; Rehman & Khan, 2012; Shipton et al., 2012; Judge & Elenkov, 2005). In this vein, most decision issues in project management are related to dealing with uncertainty, complexity and the implicit ambiguity, particularly with regard to systematics and interrelatedness within project decisions. Various issues need further exploration to align organisational strategy and the project concept (Svejvig & Andersen, 2015; Williams & Samset, 2010).

Though KM literature offers various models for managing knowledge activities in projects in an attempt to discuss and solve numerous organisational issues, most of the work focuses on knowledge sharing. Moreover, a large number of knowledge-sharing studies uses social capital and network theories from structural, relational and cognitive dimensions, however, structural holes and the closeness of network theories are relatively underexplored (Park & Kim, 2015; Wang & Noe, 2010). Social networks, including the characteristics and issues of the community of practice, are rarely examined and more understanding is needed that might jointly influence knowledge sharing and other individual or contextual factors. For example, issues regarding different types of relational tie, such as horizontal versus vertical ties among different parties involved in specific knowledge topics, demand further investigation. Scholars assert that more than two thirds of the research on knowledge sharing has been conducted quantitatively, whereas there is a particular need to provide rich and in-depth investigation of the organisational context in which knowledge sharing arises. Several issues still need further investigation and explanation, such as managerial behaviours and actions, as well as knowledge ownership, to identify more types of knowledge. This would offer useful insights into how organisations can influence employees' perceptions of knowledge ownership to increase an organisation's learning capacity (Park & Kim, 2015; Wang & Noe, 2010).

The KM literature offers several studies concerning IT projects, most of which are related to critical success factors (Sharma & Singh, 2015; Wong, 2005). Other studies focus on assessing

knowledge management systems, innovation and capability audit issues, and how technology can be an enabler to support knowledge management related activities (Jennex & Olfman, 2005; Lee & Choi, 2003). Further work concerns knowledge management strategies and systems to support the implementation of IT projects (Hislop, 2013; Bingi et al., 1999). However, knowledge mobilisation and network issues are still unexplored. Drawing on the reported poor success rate of IT projects and change programmes in general, the studies reviewed so far suffer from a lack of empirical evidence in the area of knowledge mobilisation and knowledge networks, so clear investigation concerning the issues is weak.

Knowledge management literature provides three most common knowledge components including “know how” “know why” and “know what”. The term “know how” deals with single component of intellectual capital in knowledge management and widely used in manufacturing operations and designing process. The term “Know why” explains the reasons behind phenomena, problems or issues, by having insights into “wisdom level” of series. The “know what” represents the realisation of such phenomena (Carud, 1997). However, knowledge mobilisation studies implicitly highlight new knowledge component of “know who” in networking. The term “know who” in knowledge networks represents key knowledge holders, key knowledge brokering, key knowledge players and main influential people in an organisation. Previous studies have noted the importance of identifying key knowledge holders in IT projects intervention in all processes of pre-implementation, implementation and post implementation. Two case studies were the best examples in attempting to explain the role of knowledge networks in IT project intervention (Hislop et al., 2000). Two large companies tried to introduce ERP and information management (IM) systems. The two systems failed as a result of ignoring key knowledge holders’ involvement in decision-making processes (see Appendix F for more details). The failure, in both cases, pinpointed concerns regarding the relationships and connections in a sophisticated culture when political considerations were involved (Hislop, 2013; Hislop et al., 2000).

2.6 Research gaps

The studies reviewed so far suffer from practical research in the area of knowledge mobilisation, so clear evidence concerning issues surrounding it is weak. Related work in the area of KMob and KNs was conducted in two main areas, knowledge transfer and exchange, in health industry. Majority of existing work discusses barriers and constraints in those two areas, but there is a lack of empirical study focusing business practice (Levin, 2008; Mitton et

al. 2007). Perhaps the most serious drawback of knowledge management research is that many studies have been built on a separate framework. This has been reflected in KMob research as lacking evidence of a practical nature (Qi & Levin, 2013; Levin, 2008). While some research has been conducted in terms of KMob, most of it focuses on enhancing the education or health sectors in only specific part of the world. Organisational issues regarding knowledge mobilisation have been relatively unexplored.

Change management studies have long focused on the assessment of issues related to decision making for the purpose of strategy selection (Cricelli et al., 2014; Bloodgood & Salisbury, 2001). Conversely, the exploration of knowledge mobilisation to support knowledge management activities and improvement of an organisations' decision making capabilities has only been seen over the last few years. It is important to note the issue that, especially in the case of IT project-oriented change management, knowledge mobilisation networks have not been explored and supported with evidence in the literature. Therefore, this study begins to address the issue and will focus on four key aspects as discussed below.

- Empirical research reports that most top management, including chief executive officers, middle management and department managers, lacks an understanding of the importance of change management strategies in IT projects (Hayes, 2014; Jorgensen et al., 2008). This reflects a lack of top management support in identifying knowledge management channels in change management processes to support decision-making (Neumann, 2014; Gareis, 2010).
- Missing key project details occur owing to a lack of understanding about how such activities in knowledge management strategies should be undertaken. This has an impact on understanding the importance of project documentation; through this, knowledge is not processed to support change strategies and therefore, ultimately, it does not enhance the lessons learnt (Altamony et al., 2016; Ajmal et al., 2010; Gareis, 2010; Gould & Powell, 2004; Smith, Burstein & Sowunmi, 1999).
- Knowledge networks are not systematically structured so knowledge channels remain intangible. This has caused poor coordination of the collective knowledge among parties to enhance decision support systems (Neal et al., 2015; Garcia-Lorenzo, 2008).
- Poor practice of knowledge management strategies and applications has caused a lack of employees' involvement in mobilising their knowledge and supporting decision

making in the selection of change management strategies, planning and creating vision (Dayan et al., 2017; Qi & Levin, 2013; Rebecca, 2013; Ajmalet al., 2010; Hossain & Shakir, 2001).

To address some of the gaps, this research attempts to integrate KM, ChM and PM in IT projects context. Such analysis includes, but is not limited to reasons why ChM programmes face a high level of failure, significant issues concerning project management and IT projects, KM practices in ChM programmes, PM and IT PM. Consideration has been given not only from operational angles, but also from strategic perspectives.

2.7 The conceptual framework

This section explains the formulation of the conceptual framework based on the literature. Table 2.2 explains how the conceptual framework was developed. It explains the process of construction the framework comprising four main criteria. The four criteria are the inputs, the theories used, the reasons why specific theory was utilised and the outcomes.

Table 2.2: The process of developing the conceptual framework for this study

Inputs	Theories used	Reason	Outputs
Extensive literature review on KM related studies and issues	➤ Knowledge creation theory (SECI model) Nonaka & Takeuchi, 1995).	➤ To identify Knowledge networks across organisations	➤ Bringing further understanding into the meaning of knowledge networks and their connections
Literature review on actor network theories in organisations (i.e. the role of intermediaries).	➤ Actor Network theory (Callon 2007; Czarniawska & Hernes, 2005).	➤ To identify the roles of actors within knowledge networks	<ul style="list-style-type: none"> ➤ Networks assist firms with access to knowledge, resources, markets, or technologies. Firms acquire knowledge through their positions within networks. ➤ Connecting procedural knowledge to lesson learnt ➤ Gaining insight into the multifaceted socio-technical problems related to IT projects within networks
Literature review on understanding the role of organisational factors and knowledge management infrastructure in knowledge mobilisation KMob	➤ Knowledge mobilisation theory (Ferlie et al., , 2015).	➤ To understand knowledge mobilisation issues through channels	➤ Facilitating KMob within and across organisational boundaries
Literature review on ChM issues and IT project issues	<ul style="list-style-type: none"> ➤ ChM theories (Dayan, et al., 2017; Neumann, 2014; Gareis, 2010). IT project management theories Ajmal et al., 2010; Gareis, 2010). 	➤ To understand current interrelated issues within project decisions and complexities	➤ Enhancing decision support for strategic intervention in IT project-oriented change management

A conceptual framework has been developed in this study, called CMKNM, as shown in Figure 2.2. The CMKNM framework perceives knowledge sharing as a dynamic process centred mainly around the classic SECI model (Socialisation, Externalisation, Combination and

Internalisation) knowledge creation theory model (Nonaka & Takeuchi, 1995). Four new knowledge networks are proposed in this research for the movement and mobilisation of knowledge across boundaries.

The four kinds of knowledge networks are: knowledge networks of interactions, knowledge networks of interpretations and translations, institutional knowledge networks, and knowledge networks of influence. These networks were mainly developed from the classic SECI model of knowledge creation theory where knowledge moves through a cycle, progressing from tacit to tacit, then tacit to explicit, followed by explicit to explicit, and finally explicit to tacit (Venkitachalam & Busch, 2012; Nonaka & Takeuchi, 1995). The connections between these networks have been developed based on related work from the knowledge mobilisation literature. During the creation of knowledge networks, actor network theory was applied in an attempt to gain insights into the identification of actors' roles among networks (Tzortzaki & Mihiotis, 2014). For instance, knowledge networks of interpretation and translation were explicitly used by the Canadian Institute of Health Research (CIHR); these included the synthesis, diffusion and exchange of knowledge to create effective healthcare systems (Gagnon, 2011). However, Knowledge Networks of interpretation and translation were not specifically defined in literature, the CMKNM has defined it as an independent entity with its own roles and functions. It is linked to the knowledge networks of interaction which were developed based on knowledge creation theory where knowledge is created from individuals. This is because large IT intervention project-based change management consists mostly of outsourcing (Neumann, 2014; Jorgensen et al., 2008).

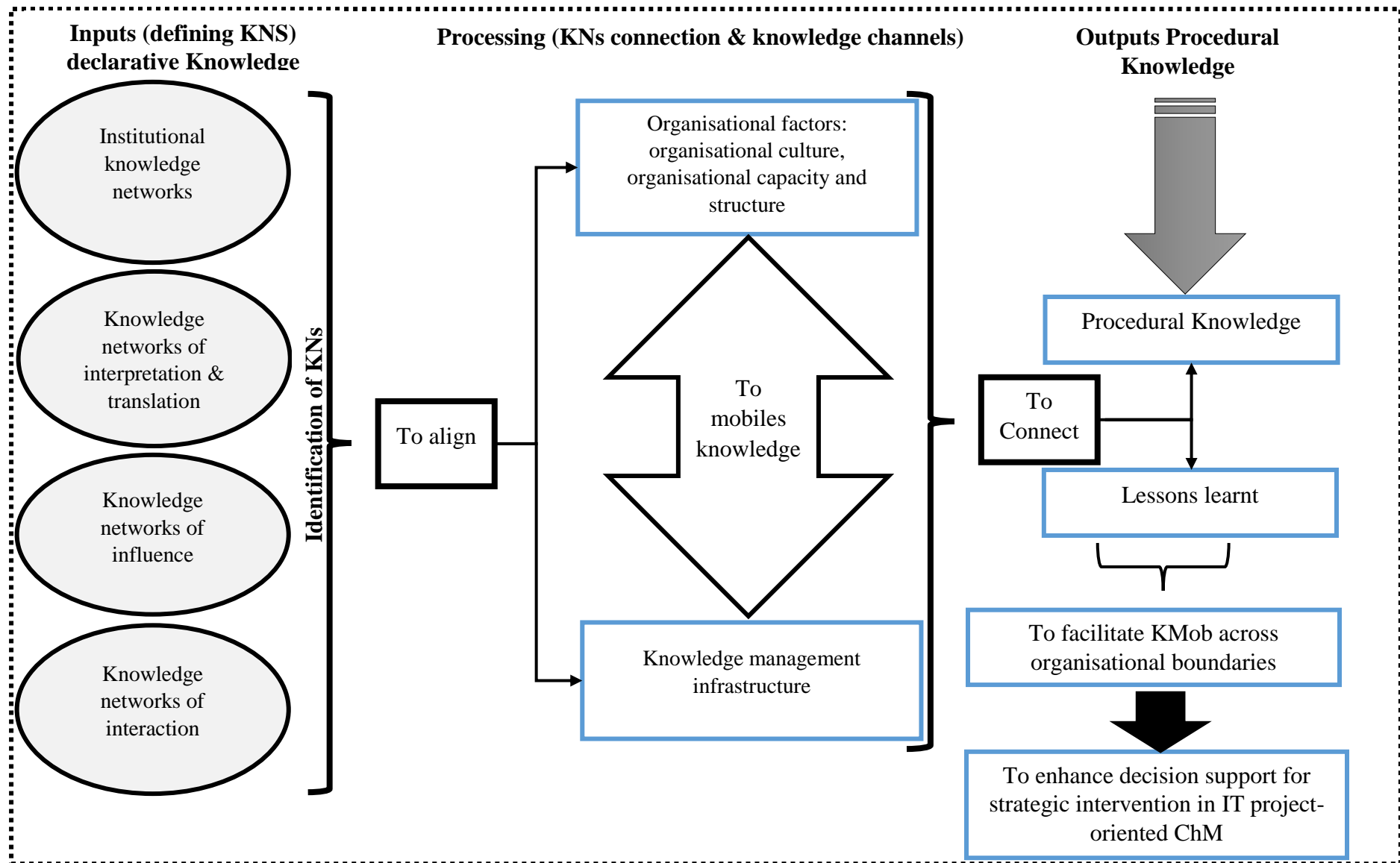


Figure 2.2: The conceptual framework CMKNM

In order to connect these knowledge networks to address factors such as interoperability, coordination, cooperation and regulations to trace knowledge and support decision making, some knowledge mobilisation studies have highlighted the role of knowledge brokering and knowledge intermediaries in educational sectors (Cooper, 2012; Ward et al., 2009; Cooper, 2010; CHSRF, 2003; Hossain & Shakir, 2001). Knowledge brokers might be an organisation, individuals, third parties or change agents who facilitate collaboration and innovation by connecting different organisational activities, both internally and externally. Furthermore, a knowledge broker acts between knowledge networks of interaction and knowledge networks of interpretation and translation as a coordinator to assure the quality and accuracy of messages and details before they are further evaluated and finally fed into the knowledge base. However, a knowledge network of interpretation and translation has to act as a knowledge filter in order to deliver effective knowledge, via appropriate means of communication, to institutionalise and store it in a knowledge base. Following this, effective knowledge will move from institutional knowledge networks to knowledge networks of influence. At this stage, knowledge will be put into action so it can be mobilised. This is relevant since the main aim of knowledge mobilisation is to put knowledge into action ultimately to utilise it in decision making activities (Lutz, Boucher, Roustant, 2013; Levesque & Works 2010). Thus, the CMKNM defines knowledge mobilisation as a dynamic process of continuous knowledge transfer, consisting of knowledge networks to connect knowledge brokering, knowledge bases, effective knowledge and knowledge seekers, while aligning key organisational factors and KM infrastructure to connect procedural knowledge to lesson learnt.

Three main reasons are behind the establishment of the framework. The CMKNM offers new insights into knowledge mobilisation by defining four different knowledge networks alongside the connections between them. These knowledge networks, if they are systematically structured, increase the likelihood of facilitating knowledge mobilisation and providing traceability. They also aid the connection of procedural knowledge to “lessons learnt”, resulting in the ability to support decision making. The role of knowledge brokering and knowledge intermediaries in the knowledge network processes, in order to solve issues such as interoperability, coordination, cooperation and regulations to support decision making, was introduced to ensure the quality of messages and details, as well as to increase the practice of knowledge management activities. Furthermore, the CMKNM provides alignment between the identified key organisational factors and KM infrastructure to mobilise knowledge across boundaries to achieve a long-term strategic vision.

2.8 Summary

This chapter provides an overview and findings from relevant literature in KM, ChM, PM, project oriented organisations, knowledge mobilisation and KNs. Generally, most existing studies have attempted to understand the role of KM in ChM and IT PM, while identifying a new body of knowledge; this still requires a systematic review and critical analysis of existing studies (Svejvig & Andersen, 2015; Tranfield et al., 2003). This chapter attempts to analyse KM, ChM and IT project management from an integrated perspective Knowledge mobilisation is viewed as prompting decision making by transferring the right knowledge to the right people by the right means at the right time (Levin, 2008). Although little work has been carried out regarding understanding knowledge mobilisation issues to explore concrete concepts across business sectors, particularly in IT projects' ChM within and across boundaries. Structured KNs ensure that greater understanding facilitates knowledge mobilisation and knowledge sharing across organisational boundaries. Thus, this chapter identifies research gaps and proposes a conceptual framework to define the key constructs and the links between the constructs in order to realise knowledge mobilisation supported by structured knowledge networks.

Chapter Three Research methodology

3.1 Introduction

This chapter outlines the research methodological framework used for this study (Refer to Figure 3.1 for more details on the study design). It discusses the research methods and justification for choosing the methods. It explains how the methodological framework was constructed and used to ensure that the research design, data collection techniques and data analyses all fitted to the purpose of the research. Chapter Three begins with the philosophical approach to the study, specifically, the benefits of utilising a qualitative design, followed by research design and the research strategy. Data collection and analysis techniques are explained in detail. Finally, the chapter ends with a summary.

3.2 Research philosophy

The quality of a research study cannot be ensured if the researcher has a poor awareness of research philosophies. The term ‘research philosophy’ refers to a cohesive plan for how research data should be collected and analysed (Jackson, 2001). Ontology and epistemology are the most commonly debated philosophies in this regard. The former refers to the “character of existence and the universe” and the latter concerns “the most efficacious means of investigating the character of the world” itself (Easterby-Smith et al., 2012, p. 17).

Some scholars assert that the primary ontological position is critical in determining decisions which precede any other choices regarding research methods, techniques, and epistemological decisions (Priyono et al., 2015). However, each of these approaches is comprised of a number of antagonistic paradigms, each of which incorporates several options on the spectrum between the two aforementioned positions (Easterby-Smith et al. 2012; Meredith et al., 1989). The nature of this plan depends on all kinds of factors, including the type of phenomenon or event which is being investigated.

Thus, the most important philosophical concepts relate to ontological and epistemological perspectives which use different methods but both attempt to fulfil a scientific commitment to ‘convert assumptions into realities’ (Saunders et al., 2015; Galliers, 1992, p. 144-162). As Cornford and Smithson (2006, p. 61) explain, the term ‘ontological’ describes the construction of fundamental assumptions made about the ‘truth’ of the targeted phenomenon or event. Conversely, epistemological research involves the construction of a legitimate and verifiable

truth via the thorough exploration of a phenomenon or event (Cornford & Smithson 2006, p. 61). Hence, epistemological research can describe a perspective which ascribes legitimacy only to the experience of a subject within a targeted environment (anti-positivism) or a perspective which connects broad justifications to uniformity and causal correlations (positivism) (Creswell & Poth, 2017; Grix, 2002).

The goal of a research philosophy is to explore the nature of knowledge. In this, it has to be firm, consistent and compatible with being delivered in a perceptible form, as opposed merely to offer understanding in terms of the intimate and personal knowledge (Saunders et al., 2015; Irani, 1998; Morgan & Burrell, 1979). Thus, a great deal of contemporary research involves empirical data. This is, to a large degree, due to the philosophical belief that objective evidence (not discussion or reasoning) is the only way to determine whether or not a theory is valid.

Figure 3.1 explains how the methodological framework was constructed to fit for the aim of this study. It describes how the philosophical approach in this research was viewed from both the ontological and epistemological stances. Following this, the research paradigm and research approach of both deductive and inductive were evolved. Thus, the research design is then constructed alongside data collection techniques and analysis procedures. The researcher's chosen area of expertise and discipline has an impact on determining the philosophical stances that are to be taken. For instance, within the field of the natural sciences, researchers usually assume a positivist stance, while those working in social sciences are prone to utilising an interpretivist philosophy in their research. Nevertheless, most researchers choose between one of many different options and the choice is not a binary one (Croom, 2009).

It is important to consider extensively before selecting a philosophical preference over other possibilities although it is not necessary to place much significance on the degree to which the research is philosophically based (Saunders et al., 2009). In terms of this research domain, scholars argue that there is no single cohesive framework which can accommodate all the domains of knowledge required for investigating IT related studies (Galliers, 1992, p. 144-162). They also believe that IT related subjects cannot be rooted in a single domain approach as several philosophical perspectives could inform the phenomenon or event being investigated (Saunders et al., 2015; Baroudi & Orlikowski, 1991). The chosen research philosophy and method will have an impact on how research questions are answered. Similarly, the structure of the research questions will influence the selection of the research strategy, data collection

methods, and analysis strategies, in addition to the timescale of the study (Saunders et al., 2009).

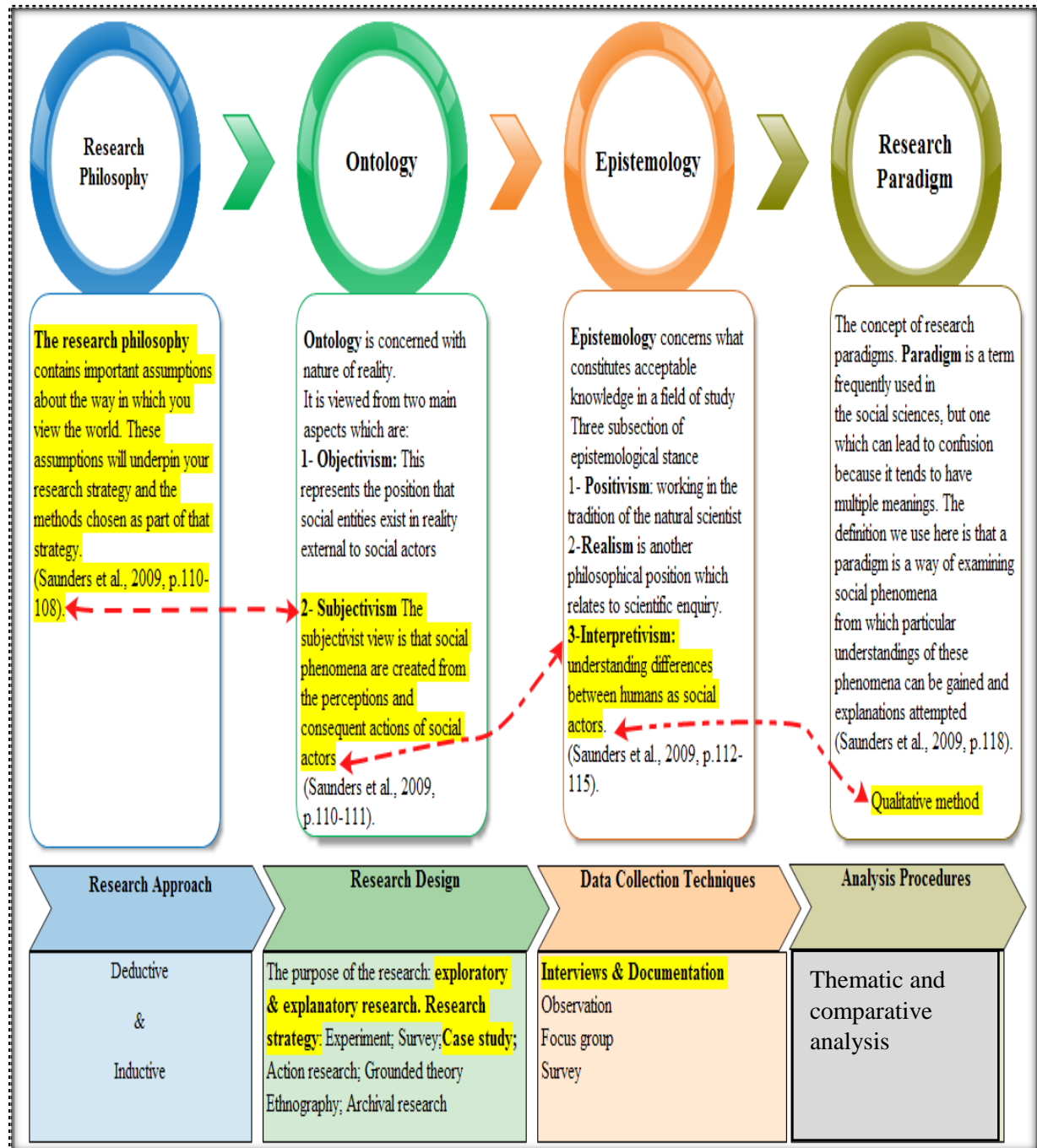


Figure 3.1: The methodological framework and the selected options highlighted

3.3 Research paradigm

With the above mentioned in mind, researchers establish suppositions which consequently shape their world-view, influence how the researcher chooses a research strategy and

subsequently creates a research design. Researchers emphasise the importance of extensively considering a philosophical preference over other possibilities, however do not place much significance on the degree to which the research is philosophically based. They classified research philosophies into four categories: positivism, realism, interpretivism and pragmatism Table.3.1 (Saunders et al., 2009). Table 3.1 offers a brief comparative overview of the four categories mentioned above in terms of ontology, epistemology, axiology, and methods of gathering data.

Table3.1: Comparison of positivism, realism, interpretivism and pragmatism in research philosophies (Source: Saunders et al. 2009, p.119).

Axiology: the Researcher's view of the role of values in research	Epistemology: "the most efficacious means of investigating the character of the world" itself (Easterby-Smith et al., 2012, p. 17).	Ontology: the "Character of existence and the universe" (Easterby-Smith et al., 2012	Positivism	
Research is commenced in a value-free way. Researcher is independent of the data and preserves an objective stance.	The investigator is independent from the phenomenon observed and its exploration, thus its characteristics need to be determined without any influence from researchers and their bias; they should be determined in an objective way.	External, objective and independent of social actors.		
Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will influence on the research.	An investigating agent can endeavour to successfully reveal what are called critical realists, while advocates state that it is superior to that of positivism as it can permit the investigator to determine trends and patterns in data emerging from societal events. Such phenomena depend on the scenario, and thus must be interpreted and seen in virtue of that (Sayer, 1992).	The benchmark of truth and validity. Internal perspective, only a single truth exists. Constructed or extrapolated without a researcher intervening in the process, as per internal realists (Easterby-Smith et al. 2012).	Realism	
Research is value bound. The researcher is part of what is being investigated, cannot be detached and so will be subjective.	Society is in some part responsible for shaping reality and knowledge thereof, as people make their own reality and attribute meaning to the that reality accordingly.	Socially established, subjective, may change, multiple.	Interpretivism	
Values are the key role in interpreting results, the researcher implementing both objective and subjective meanings of view.	Either or both observable phenomena and subjective meanings can deliver acceptable knowledge dependent upon the research questions. Emphasis on practical applied research, incorporating various views to help interpret the data	External, multiple, view chosen to best enable answering of research question.	Pragmatism	

The way in which the researcher pursues the acquirement of knowledge can be determined by the comprehensive framework of the research paradigm (Nogeste, 2007). However, it is also argued that such studies on research philosophy are lacking a broad enough affirmation when it comes to the nature or amount of key research perspectives being utilised. For example, despite for the fact that certain methodologies are in some way owned by an epistemological perspective, researchers are still able to utilise many of these epistemological positions to their benefit, even antipodal one to their methodology. In consideration of this, reinforces the belief that all empirical research has the potential to be phenomenological or positivist. In some circles, this is referred to as an interpretative, an anti-positivist, or a descriptive viewpoint (Remenyi et al., 2005, p. 22-38). This concept is based on the support of previous studies, which points to a substantial incongruity within the research in relation to whether the research perspectives and fundamental epistemologies are clearly conflicting or could be applied within a single investigation (Creswell & Poth, 2017; Myers, 1997).

As can be seen in the Table 3.1 the positivist approach considers the researcher from two distinct viewpoints: as a translator of a perceptible social truth and as an impartial evaluator. It also presumes that the researcher is an independent figure who is not directly impacted by or does not personally affect the conditions of the phenomenon. Positivism believes that recorded outcomes are a product of independent factors (Remenyi et al. 2005, p. 22-38). It also believes that clear evidence and simple explanations are vital and that it should be relatively easy to apply the outcomes to wider populations. Positivism originates from the natural and corporeal realms and so is defined by its verifiability, its capacity to be disproved, and its reductionist features (Saunders et al., 2015; Galliers, 1992, p. 144-162).

The philosophy of pragmatism has the capability to function within the philosophies of interpretivism and positivism; therefore, researchers have concluded that pragmatism is a critical component of establishing the research philosophy (Saunders et al., 2009). Pragmatism supports the investigation of data sets in detail rather than employing either qualitative (induction) or quantitative (deduction) methods individually (Venkatesh et al., 2013); it can therefore amalgamate several viewpoints that will support data collection and analysis. Pragmatism essentially involves abductive reasoning which encompasses both induction and deduction, fluctuating between either approach based on the requirements at hand. Thus, a philosophy of pragmatism can simultaneously employ both qualitative and quantitative methods (Saunders et al., 2015; Maxcy, 2003; Howe, 1988). However, a pragmatist position argues that it is possible to work within both the positivist and interpretivist paradigms when

research questions do not suggest explicitly that either philosophy is adopted. Thus, the pragmatist's view is to incorporate a positivist or interpretivist philosophy to work with variations in terms of epistemology, ontology and axiology.

Within the natural sciences, realism is the most commonly adopted position, while nominalism is more common for those in social science fields. From a realist perspective, reality is 'out there' and thus is separate and distinct from the researcher. Thus, reality can be understood by the researcher (who cannot impact on or alter the truth) relatively easily. Realists believe that progression in science may only take place after the investigator has assessed a subject or discipline that is connected in a direct manner with the thing being investigated (Easterby-Smith et al., 2012). Therefore, observations that are made are distinct and autonomous from the theory being employed, although the researcher needs in some way to examine those observed phenomena (Saunders et al., 2015; Meredith, 1998).

From the perspective of an internal realist, scientific laws may be constructed or extrapolated without a researcher intervening in the process. Indeed, although scientific truths are certain and independent from the researcher's bias, he/she is unable to construct a total set of facts (Easterby-Smith et al., 2012). Truth exists, according to the internal realist's perspective, but it nevertheless remains uncertain as it is reliant on the ontological basis of nominalism. As a result, researchers who utilise an internalised realist perspective cannot present every piece of appropriate data at any point in time. Conversely, the internalist-realist perspective is one that demands the research to discover things within the discipline in question using an active procedure before extrapolating and interpreting to determine a truth (Easterby-Smith et al., 2012).

Critical epistemology identifies another source of realism that is called critical realism which is an assimilation of constructivism and positivism (Easterby-Smith et al., 2012). For example, those who believe that there is a real truth and that an investigating agent can endeavour to reveal it successfully are called critical realists. Advocates state that this is superior to positivism as it can permit an investigator to determine trends and patterns in data which emerge from social events (Saunders et al., 2015; Easton, 2010). This perspective uses the principles and features of existing social behaviours as its research criteria and prioritises historical information. Thus, champions of the critical approach are trying to offer the type of social commentary which exposes obstructive and isolating features of the event or scenario being studied (Myers, 1997). It should also be noted that these researchers focus mostly on

extended ethnographic and historical investigations of the practices which constitute organisational structures. This idea has been reinforced by explaining that critical epistemological research must be constructed with an understanding of the social outcomes if it is to make the most of all the participating subjects (Jackson, 2001).

With the above mentioned in mind, this research focuses on philosophy of interpretivism since other philosophies are out of scope of this study. The next section justifies the reason behind the choice of such paradigm.

3.3.1 Justification for the choice of the research's philosophical paradigm

Interpretivistic studies have a philosophical foundation which is built upon the phenomenological method (Remenyi et al., 2005, p. 22-38; Myers, 1997). Phenomenological presumptions (as opposed to the positivist approach) do not believe that the world is defined by unifying truth. Instead, they emphasise the significance of subjective consciousness. Therefore, all events are treated as unique and their import is thought to be a product of the conditions and the people associated with them. Crucially, the phenomenological researcher does not stand apart from the focus of the study but is a fundamental contributor to it. It means that the researcher must interpret more than the basic elements of the event to identify the truth that they originate from (Remenyi et al., 2005, p. 22-38). Moreover, the phenomenological investigator knows that the world is not really made up of many different truths but that, ultimately, every truth is a relic of its own. This conceptualisation differs from positivist study because it does not lend itself well to oversimplification or to broad applications. This is, of course, aside from making it clear that the phenomenon is real. For all of these reasons, the phenomenologist sees the world as a social construction (Creswell & Poth, 2017; Remenyi et al., 2005).

From an interpretivist perspective, the key philosophical presumption is that the acquisition of truth lies only in social constructions such as language and collective interpretations. This is because interpretive research aims to explore a subject in accordance with the definitions and interpretations which have been allocated to it (Myers, 1997). For instance, the fundamental nature of interpretivist thinking is described as the ability to accommodate ideas which develop from real world information (Galliers, 1992, p. 144-162). Support is also provided by explaining that the interpretivistic viewpoint is not concerned with prejudging independent or dependent variables. Instead, it scrutinises the comprehensive and intricate process of human

reasoning and logic at the same time as a particular event or behaviour occurs (Creswell & Poth, 2017; Kaplan & Maxwell, 1994). Thus, information scientists have called for a dynamic approach to compatible social and information science studies (Jackson, 2001).

The interpretivist viewpoint within information science study is concerned with ‘providing an awareness of the context of the information science and the way in which it informs and is informed by this context’ (Walsham, 1993, p. 4-5). Information scientists believe that information systems and IT projects has moved from a technical interpretation to one which accounts for organisational, human and social elements (Lippit, 1973; Black, Mouton, Barnes & Greiner, 1964, pp. 133–155; Rogers, 1962).

After deliberation, the interpretivist approach was selected for this study. The objective of this study is to support the development of new knowledge into social and business aspects by using interview sessions and documentation/reports of some kind. Both of these instruments depend on the researcher being able to interact with the study’s subjects. The empirical research protocols for information and social science are largely determined by the decision to use an interpretivist or positivist perspective. The interpretivist perspective states that researchers can only improve their understanding if they contribute directly to the event or circumstances being investigated. On the other hand, the positivist perspective believes that the researcher should become an impartial spectator (Saunders et al., 2009; Irani et al., 1999). The literature review identified a great many existing studies which discuss the key social, organisational, cultural, political, technical and administrative challenges associated with knowledge management and IT project management practices. These challenges are endlessly intricate, interconnected and interspersed; this means that they cannot be isolated from their cultural and structural circumstances. This is why it is clear that, in order to acquire understanding, the researcher does need to take part in the event or situation being investigated. This may be in conflict with the principles of positivism but it is appropriate for interpretivist research.

Since this study focuses on giving further understanding on KNs and KMob from various practices, the social constructed issues are also varied. This means there is no single reality that can directly linked to certain phenomena. Another reason is related to obtaining in-depth information about certain issues linked to the research question which need to be understood and accordingly interpreted. Thus, the use of qualitative method (see the next section) allows the researcher to investigate in-depth a small sample. This may ultimately develop more

understanding into the concept, interpreting the result and allowing new themes to be emerged (Saunders et al., 2009).

3.3.2 Justification for the choice of the qualitative research method

Multiple research methods can be utilised as a study framework when carrying out social investigations (Saunders et al., 2009; Thomas, 2006). Two of the most dominant methods are quantitative and qualitative. The qualitative method was created by social science experts as a way of helping researchers to explore cultural and social behaviours (Yin, 2015; Saunders et al., 2009). In contrast, the quantitative method was developed by natural science experts to support the investigation of natural events (Myers, 1997). The purpose of quantitative studies is to quantify and analyse data statistically so they can be used to make unambiguous inferences about a given subject (Saunders et al., 2009; Cornford & Smithson, 2006, p. 62-64). On the other hand, qualitative studies are closely linked to epistemological and interpretivist research. Qualitative research is typically amassed in the participants' environment during which specific patterns appear. A qualitative approach was chosen since organisational decisions and contexts are generally idiosyncratic and are driven and managed by circumstances that pertain to a particular organisation (Creswell & Poth, 2017; Themistocleous, 2002).

It is clear that the conditions which create an 'event' are influenced by interconnected factors like cultural norms and time; there are no identical research subjects (Yin, 2015; Irani, 1998). For example, this study sets out to gain deep insight into knowledge management activities. In particular, it attempts to understand how knowledge networks could be built, how knowledge networks could be structured, what the outcomes are from building networks, and what issues are involved in building knowledge networks. To answer these questions, this research has moved from theoretical concepts to a practice-based perspective. Scholars in this regard assert that studies which focus on the application of knowledge transfer practices should recognise the truth of the intricacy of social events (Thomas, 2006). It means that the researcher needs to concentrate on the context as well as the practices themselves. For this reason, qualitative methods are the superior choice.

The qualitative method allows a researcher to investigate innovative subjects related to information science and IT projects in a realistic environment and then to support the construction of hypotheses (Walsham, 1995; Benbasat et al., 1987). Furthermore, qualitative research is perceived as a significant approach to construct a more detailed system of

knowledge concerning why organisations adhere to certain practices (West & Dedrick, 2003). In order to understand the interactions of knowledge networks, which is the subject of this study, as well as addressing complex issues and embedded relationships in certain markets, an inherent flexibility was required. A qualitative approach, in this regard, offers the opportunity to gain in-depth insights into a phenomena (Gupta & Polonsky, 2014; Dubois & Araujo, 2004).

However, qualitative research evaluation has been shown to be more challenging than evaluating data in quantitative research and so the mechanisms involved must be better defined (Easterby-Smith et al., 2012). For instance, qualitative data are almost always in written form. There are benefits to this, but it also means that much of its detail may be eliminated when attempts are made to interpret and generalise it (Themistocleous, 2002). Also, it can be quite formless and uncontrolled, particularly when focusing on human actions and behaviour. Qualitative research deals with big ideas and data, but it can only usually observe a small population (Cornford & Smithson 2006, p. 145). Although the researcher remains a spectator, which makes it more likely that a great deal of information and insights will be gathered, the depth and intricacy of the outcomes suggest that they are very sensitive to interpretation. Thus, researchers' misinterpretation of the data can be dangerous and may change the outcomes as 'bias' can be involved. This is something for which qualitative researchers must set protocols to eliminate any intervention into issues. However, some of these weaknesses can be controlled by applying strict dialogue protocols. For example, the researcher should avoid asking any questions which might encourage a subject to answer in a certain way (Refer to Appendix C) for more details.

3.4 Research approach

The term 'research approach' describes the combination of theory construction and data collection techniques. There are two main dominant approaches: deductive and inductive (Creswell & Poth, 2017; Saunders et al., 2009). The inductive method begins with a small amount of supporting content and research while the hypotheses or study questions are formulated using the acquired data (Saunders et al., 2009; Clayton and Gorman, 1997, p. 5). The inductive method focuses on data whereas the deductive method prioritises theory (Saunders et al., 2003, p. 117-122).

These are two means of justifying theoretical development using inductive means on the basis of the research questions: phenomena and theory-driven questions (Eisenhardt & Graebner,

2007). With regard to theory-driven questions, the research tried to widen understanding of the subject using previous research studies. Within this categorisation, the researcher utilises previous research studies as a base from which a new theoretical framework can be devised before applying this as a basis for inductive studies. There is a strict need for such research studies to utilise former studies as a foundation for the research. Nevertheless, with regard to questions of a phenomena-driven nature, then researchers undertake an investigation wherein the issues have been highlighted in the subject or field, even though no theory exists that adequately describes them. New ideas and understandings are then extrapolated from such a research method, and these are reliant on the following: the availability of empirical evidence, the significance of the phenomenon in question, and the relevance of the theories. This research endeavours to devise a new theory and so the study did not devise hypotheses to be tested at the start of the research process. The overall character of this research is inductive in nature. However, Questions (1), as can be seen below, do include a deductive aspect when analysing findings in the literature against those gained by empirical means. Question (2) was developed by utilising an inductive process through which a new theory was devised (see Figure 3.2). Here, the researcher needed to allude to the various trends and databases up to a point at which he could propose a comprehensive framework (Cresswell, 2014). The final goal of this study was to devise a new understanding of the issues regarding knowledge mobilisation and knowledge networks in IT project-oriented change management: in other words, respond to research question 2.

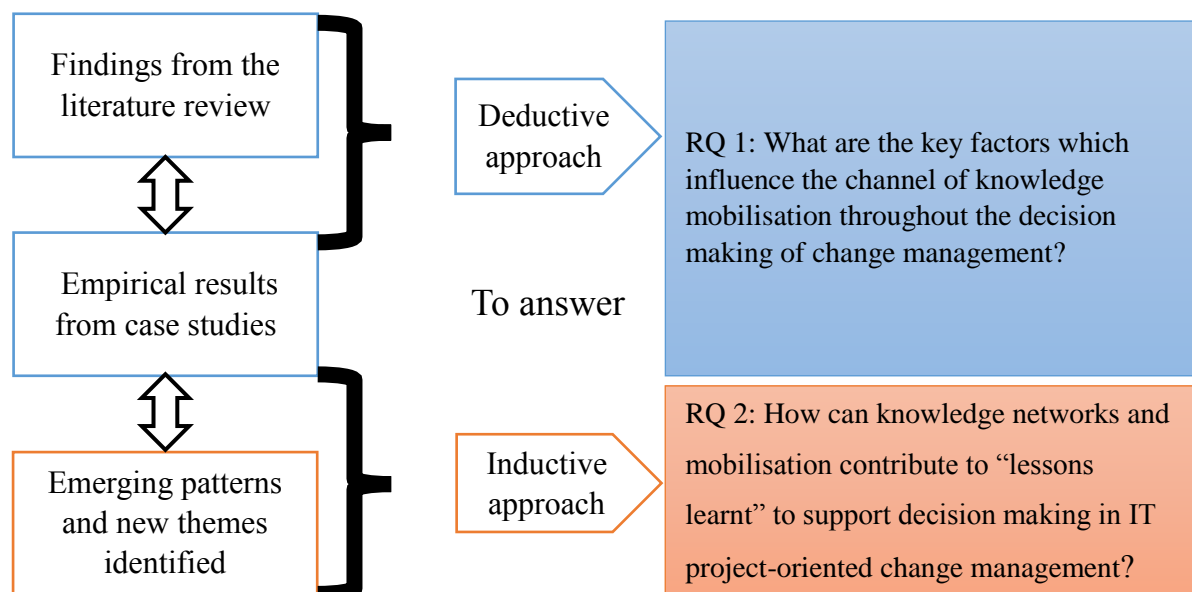


Figure 3.2: The connection between the case studies' findings, the development of the theory and the literature review.

Within positivist philosophical approaches and quantitative responses, deductive processes are generally utilised; however, such a process may be employed for qualitative studies (Saunders et al., 2009; Eisenhardt & Garaebner, 2007; Meredith, 1998). As part of a deductive research process, extant results and findings are employed to devise a preliminary constructive framework; this is presented by the study's researcher prior to the data collection stage. The aim of the deductive research process is to advance rather than create a new theory, as well as determine if the initial framework is either unconfirmed or confirmed, and applicable or inapplicable (Cresswell, 2014; Saunders et al., 2009; Hyde, 2000).

Considering the above argument, this research utilised both approaches. This was done through the use of deductive approach to develop a conceptual framework that guides the empirical study. The deductive method is inferior to the inductive because the inductive approach allows for a complete account of the behaviour being investigated; it also encourages the emergence of new concepts from the empirical findings (Cresswell, 2014).

3.5 Research design

As has been previously discussed, the chosen research philosophy and method will have an impact on how research questions are answered and objectives are met. The research design is a significant stage of the research process as a whole so careful thought has to be given. The structure of the research questions will influence the selection of the research strategy, data collection methods and analysis procedures, in addition to the timescale of the study (Saunders et al., 2009). The research design encompasses a specific plan to establish answers to the research questions of a study. It also includes formulating a plan which will enable the precise evaluation of the research subject, and establishing the extent of the study as a whole (Rousseau & Fried, 2001). The research design plan also includes a discussion of the concepts of validity and reliability and identifies the main implications of adopting different time horizons for the research design. Furthermore, it encompasses some of the main ethical issues implied by the choice of research strategy (Saunders et al., 2009).

Figure 3.3 below depicts the research design for this study. The overall research design comprises two phases: theoretical phase and empirical phase. The theoretical phase begins by understanding the surrounding concepts of KM, ChM, and PM. This allowed to identifying the current issues of KM and ChM and in turn framing the key issues. A general academic literature review was undertaken during this phase, which enabled the research questions and objectives

to be established. It also aided in obtaining a broad overview of the subject matter. Subsequently, a more systematic literature review was conducted to identify the research gaps and develop a conceptual framework on knowledge mobilisation and networks for decision making in IT project-oriented change management; the breadth of the research was also determined. Consequently, once the conceptual framework was developed based on extant literature, the research moved to the methodological stage.

During the methodological stage, the philosophical approach was enhanced, the interpretivism research paradigm was defined and the qualitative research method was selected and justified. Following this, the study employed deductive and inductive research approaches. Subsequently, the research strategy of case study was seen to be the most appropriate option as justified in the next sections.

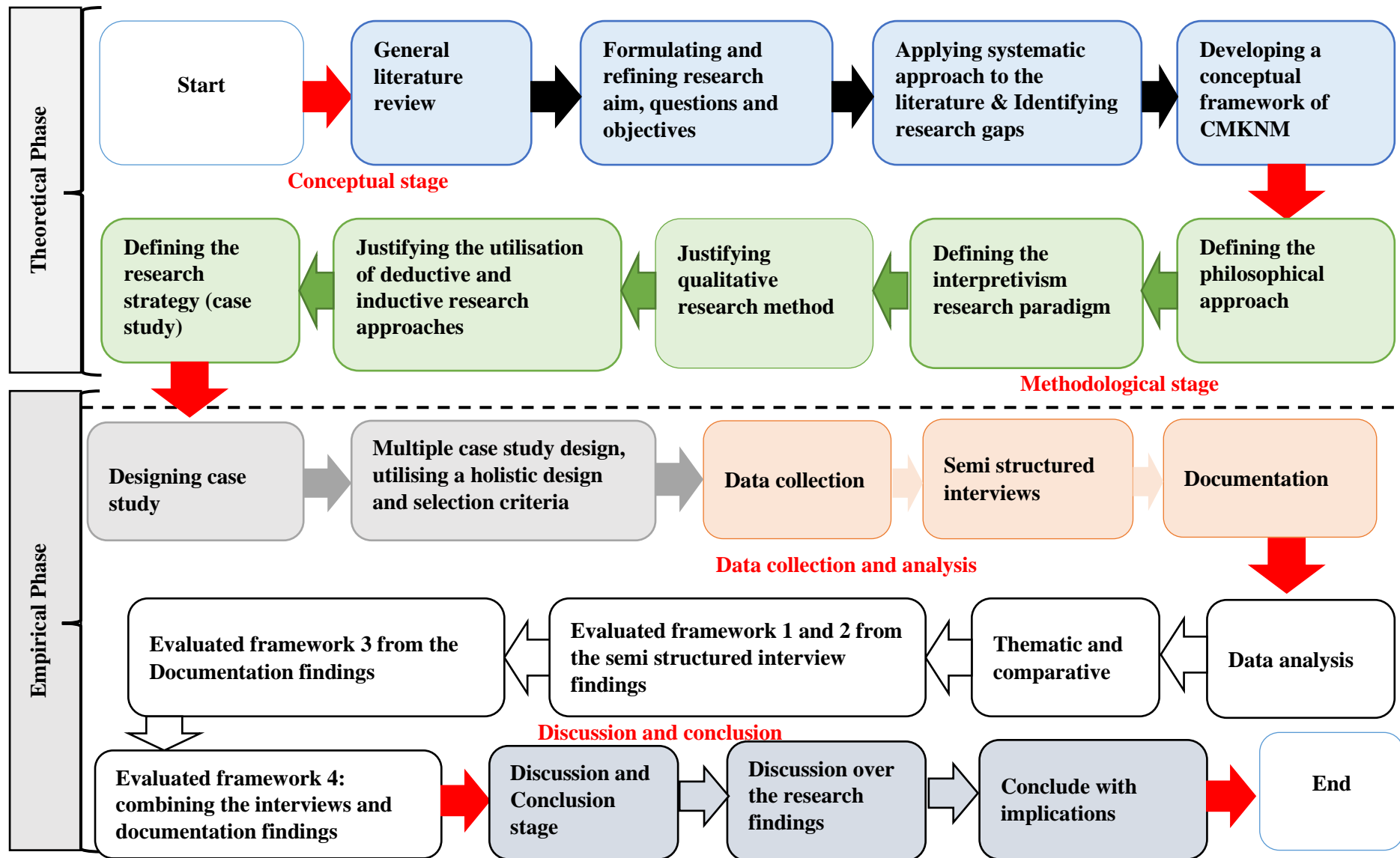


Figure 3.3: The research design of this Study

To evaluate the conceptual framework of CMKNM, this study moved from theoretical concepts to a practice-based perspective. Firstly, the case study was designed alongside the choice of multiple case study design and criteria of selection and the utilising a holistic design of case study. This is explained in details in the upcoming sections. Following this, two data collection tools were conducted including semi-structured interviews and documentation. The semi-structured interviews were commenced with 34 participants who are believed to be experts in the area of study.

After the data was gathered, the data analysis process begun. The main data analysis methods utilised are the thematic and comparative analysis. The thematic analysis facilitated the process of generating the significant themes combined by comparative analysis that assists comparing themes and views across the different companies and informants. Alongside the corporation of two independent experts, the conceptual framework has been evaluated by the results of the semi-structured interviews in two stages. Firstly, the four types of KNs have been identified by gaining in-depth insights into how international companies, local companies and public organisations exchange knowledge (evaluated framework 1), accommodating external validity against opportunities (Gupta & Polonsky, 2014; Gupta et al, 2006; Burgelman, 1983). Secondly, by revising the results through the 15-Point Checklist of Criteria (see section 3.7), the identified themes were linked to their types of KNs (evaluated framework 2). Following this, the documentation results have given further assessment into the CMKNM by identifying a new emergent concept of KN components (evaluated framework 3). Finally, the CMKNM was then further developed and improved based on the integration of both the semi-structured interviews and documentation results. This was done alongside two independent consultants' involvement to evaluate and validate the conceptual framework of CMKNM (Chapters 5 & 6).

Finally, by reviewing the findings the research was concluded. This was achieved by comparing the conclusions of existing academic research on knowledge mobilisation, knowledge networks, IT project management and ChM literature. The outcomes were the identification of areas worthy of further research and theoretical findings while both academic and managerial implications were suggested.

3.5.1 Research strategy

Research strategies focus on comprehending the dynamics of a particular situation (Eisenhardt, 1989, p. 534) while a research strategy comprises various choices such as experiments, survey,

action research, grounded theory, ethnography and archival research (Saunders et al., 2015). Each strategy can be employed for different research purposes (i.e. exploratory, explanatory and descriptive) and can belong to deductive or inductive research approaches (Yin, 2015). Nevertheless, research strategy choices are equally diverse so there is no single research strategy that is intrinsically superior or inferior to any other (Creswell & Poth, 2017). Thus, the fundamental criterion for selecting a proper research strategy does not depend on the label that is attached to a specific strategy. Instead, it depends on how a strategy can enable the researcher to answer his/her research questions and achieve the study's objectives. The selection of a research strategy is determined by the set of research questions and objectives, the obtainability of existing knowledge, and the research's philosophical underpinnings, alongside the time and resources that are needed. Research strategies also can be used interchangeably, as long as they help the researcher to achieve the overall aim of a research (Saunders et al., 2015; Saunders et al., 2009).

The nature of the underpinning philosophy of this research, alongside the research questions and objectives, guided the researcher to conduct a case study strategy. It is asserted that case studies are "empirical assessments that look into a contemporaneous phenomenon in a real world setting through in-depth investigation" (Yin, 2009, p. 18). The intricacy of the social environment is such that a degree of flexibility is required to conduct a qualitative method by employing a case study strategy. Therefore, the researcher utilised a series of study protocols which were thorough but open ended (Yin, 2003).

This subject will benefit from case study research due to its complexity and the numerous elements that result in several disparate interpretations. In the case of a researcher being unable to incorporate multifaceted phenomena to resolve certain practicable issues, there are a number of reasons why a case study strategy is preferable within the fields of information and social science. These reasons include, but are not limited to, poor metrics (poorly defined matrices), lack of theory, and the multifaceted nature of problems. Case study research is among the best means to carry out an investigation which adds to the existing body of knowledge (Yin, 2015). For example, practitioners may be unable properly to understand the information presented to them while researchers can understand a more comprehensive array of information and then use this knowledge to implement a theory that can be simply interpreted and eventually utilised (Stuart et al., 2002). The next section details a number of reasons why a case study strategy was selected for this research.

3.5.2 Justification of the choice of the case study strategy

The research strategy is considered as a practical system which the researcher employs as a way to resolve key obstacles in a realistic environment (Remenyi et al., 2005, p. 28). The formulation of a strategy is a continuous process that can be adapted or improved during the course of the research with some degree of flexibility (Galliers, 1992, p. 144-162). Although multiple philosophical presumptions can be used in qualitative studies, multiple research strategies can be employed to gather evidence from practical settings (Saunders et al., 2009). However, the decision to select an appropriate research strategy is underpinned by three factors. These are: current real world circumstances, the degree of control over the studied behaviours, and the research questions and objectives (Yin, 2003, p. 1-18).

Presently, the most popular research strategies employed in information and social science research are case studies, experiments, surveys, action research, grounded theory, ethnography and archival research (Creswell & Poth, 2017; Saunders et al., 2009; Myers, 1997). Ethnography was disregarded as the researcher needs to take part in the research process within an ethnographic research strategy. Indeed, the researcher subsumes himself in the research process itself, the individuals concerned and their part in the research. This kind of research strategy is usually employed based on the comprehensiveness of the information available. It may also be conducted over a longer period in order to determine how an object or phenomenon changes over time since ethnographic studies are undertaken longitudinally (Croom, 2009).

The archival research strategy allows the researcher to make use of organisational records and documents which are the key source of data. This is, however, not to be confused with the secondary data as this key source has to be treated as primary data. It is a strategy mainly utilised in historical studies although it can be used for different purposes to understand certain market activities and products. Some of the constraints of this strategy are related to whether the researcher has access to certain data which might give rise to confidentiality issues. Thus, missing important data may render the researcher unable to answer some research questions and meet his/her objectives (Saunders et al., 2009). For these reasons, the researcher decided to disregard this research strategy as it was seen to be inappropriate.

Survey research strategies are typically used in quantitative research to collect quantifiable data, though they may indeed also be utilised to collate qualitative data (Saunders et al., 2009). Survey research may yield superficial and descriptive data and thus it is not often the best

means of assessing multifaceted situations and phenomena. Surveys become more objective if the investigator is absent from the data collection stage; they are usually seen as a methodological choice that can be attributed to a positivist perspective (Easterby-Smith et al., 2012; Meredith et al., 1989). Thus, the survey strategy was not considered for this research due to the above mentioned reasons, alongside constraints relating to the lack of literature to explain the unexplored issues identified in this research regarding examining a set of matrices, as explained in Chapter 2.

Experiment is a type of research strategy that is utilised much in the natural sciences, although it has been employed by social scientists, especially in psychology research. Experiments focus on examining causal links, particularly changes in the correlations and interrelations between independent and dependent variables. Experiments are usually utilised to assess, contrast and examine the behaviour of a group within a specific and predetermined circumstance: two different groups of workers within different departments as an example (Easterby-Smith et al., 2012; Croom, 2009; Saunders et al., 2009). Experimental strategies are usually not feasible for many business and management research questions. This may be due to various reasons, including, for example: ethical reasons, experience issues, constraints regarding participation, providing additional support to research projects, or financial issues. Thus, this study cannot adopt an experimental strategy which cannot help to find answers to the research questions, and objectives accordingly will not be met.

Action research strategy has been utilised in management research for decades. It has been asserted that this strategy depends on four different criteria. The first is that the focus is upon research in action, rather than research about the action. For example, the researcher should be concerned with those people who are directly linked to an issue: in other words, those who experience an issue. The second criterion is that a large-scale involvement of practitioners and researchers is required. The researcher has to be a part of what is being investigated so action research endeavours to mitigate this shortcoming, thus lessening the divide between the objects that are being investigated and the agent doing the investigating (Croom, 2009; Saunders et al., 2009). Since the action research strategy requires the investigator to be a part of the process or phenomenon under investigation, the author of this research is not part of such a process, apart from investigating several issues and evaluating the proposed framework. The action research strategy was rejected for use in this research.

Grounded theory strategy requires the researcher to begin without the formation of an initial theory while the data have to be developed throughout a series of observations. The collected data guide the researcher to make predictions that lead to the generation of further data which are subsequently tested (Saunders et al., 2015). However, this study begins by conceptualising a framework and then evaluating it through a set of procedures. Thus, grounded theory strategy was not implemented in this study since the underpinning philosophy of this research contradicts the philosophical assumptions of grounded theory research.

Robson (2002, p. 178) explains a case study as “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence”. The case study strategy is mainly significant in trying to gain greater understanding of the context of the research and the processes being endorsed (Yin, 2015). It is particularly designed to offer answers to the research questions comprising ‘why’, ‘what’ and ‘how’, alongside exploring and explaining several focused research topics. The case study strategy was seen as appropriate in this research for several reasons. Information and social scientists make use of case studies to collect accurate and reliable data in order to understand more about specific research issues (Saunders et al., 2009). This strategy is a form of empirical investigation which explores a modern event within realistic settings, particularly when the margins between context and event are not decisive. The case study is also capable of accommodating and observing a broad range of contextual variables so that their influence can be determined if they do turn out to be relevant to the investigation (Yin, 2003, p.13). A case study is a comprehensive exploration of an event in its real-world environment; it incorporates several different data collection techniques as a way to acquire insights from various sources (Saunders et al., 2009; Yin, 2003, pp. 1-18).

Furthermore, Yin (2003, p. 1-18) argues that the case study is especially well suited to specific types of events; to be precise, events where existing literature is in its infancy. This is a concept which relates to this study because its aim is to determine to what degree the formative theoretical framework matches real life. For these reasons, the case study strategy was selected as it was guided by the research questions, the philosophical approach and the exploratory nature of this research.

3.5.3 Case study design

Case study design is a set of procedures that allows a researcher to link empirical results to relevant research questions. Such empirical evidence therefore offers a logical explanation of how the research questions were addressed (Creswell & Poth, 2017; Yin, 2009). The design of a case study provides a number of logical connections that link the research questions and their answers from the empirical evidence (Creswell & Poth, 2017; Yin, 2009). These logical explanations are used to corroborate the empirical findings as there is a small possibility that empirical results are not as efficacious in responding to the research questions as extrapolated explanations. Several procedures, which raise the value of the research in terms of validity and reliability, assess the coherence between the conclusions drawn with regard to the research questions and the collected data (Rowley, 2002). These procedures are explained in the following sections which show, in detail, how they were addressed in this research.

➤ Formulating the research questions for the case study

To begin with well-articulated research questions is a significant aspect of a research project. Although it is one of the most complicated aspects of any research, the theory embodied in the literature guides researchers towards formulating precise research questions. These questions, once properly generated, can be further investigated in the context of the proposed case study. However, the research questions in an exploratory approach may have to be formulated and the purposefully defined (Rowley, 2002).

➤ The study's propositions

Previous sections have explained the nature of the research questions as translated into a proposition of an exploratory practice-based approach. Case studies may be utilised to investigate emerging problems (Yin 2015; Yin, 2009). Usually, when a case study has such an intent, the objective is presented in explicit terms: for instance, the highlighting of factors impacting particular processes (McCutcheon & Meredith, 1993). In-depth investigations are needed when an exploratory case study is being undertaken but, in order to bring about this end, one case study might be sufficient (Meredith, 1998). As Chapter Two outlined, the researcher constructed a theoretical framework and then used its application to determine its validity and identify any other relevant variables (Yin, 2009; Remenyi, 1991).

➤ The study's units of analysis

The decision behind the unit of analysis is a key element and the unit of analysis this research used is the primary focus of this research (Rowley, 2002). Despite the fact that a formal statement concerning a unit of analysis is not an apparent influence on the research, an obvious iteration of this does present a number of benefits (Barratt et al., 2011). Initially, it helps steer the researcher when choosing appropriate literature connected to the investigated phenomena. Secondly, researchers obtain a better understanding of phenomena connected to extant information and knowledge (Yin, 2015). The unit of analysis can be an individual, an event, an organisation or a team although identifying the boundaries of such a unit of analysis can be a challenge for a researcher (Rowley, 2002).

➤ The logic linking the data to the propositions

The case study design can be considered from two dimensions: how the number of case studies selected contribute to the design, and the number of units selected in each case. The logic linking the data to the propositions centres around the choice between single and multiple case designs. This means if the selected method (single or multiple case) provides a critical test for a well-established theory or the case itself has some special characteristics which offer significant evidence that contributes to the established theory. This research chose to conduct multiple case designs; this choice is explained in the following sections. It is asserted that multiple case designs are preferable to strengthen the overall results of the research. On the basis of replication logic, the selection criteria for cases have to be strictly undertaken to provide either similar or contrasting evidence (Rowley, 2002).

➤ The criteria for interpreting findings

The interpretation of qualitative data should be carefully thought out and must be grounded in interviewees' or respondents' contributions. It is asserted that interpretation should include a percentage or be semi-quantified in terms of the informants agreeing or disagreeing, or having similar or conflicting points of view. Furthermore, scholars explain that such interpretation needs quoted evidence from the informants so readers can clearly see the relationship between the data and the interpretation of the data. Quotes are raw data that should not only be listed but explained, alongside their relation to the established theory, themes and the study framework. The quotes should be matched if there are similar comments from many participants and triangulated data should be explained in conjunction with other sources of evidence (Anderson, 2010). This research has strictly followed the stated criteria and various

techniques were utilised, as explained in the following sections, to achieve this objective and ensure the findings were robust.

3.5.4 Multiple case study design

One of the most important aspects of creating a viable study design is the decision between employing just a single case or multiple ones. Focusing on just one case allows the researcher to be closer to it and investigate in more detail. The descriptions and highlighting of deep structures is likely to be more comprehensive (Creswell & Poth, 2017; Yin, 2003, p. 53-55). On the other hand, Jackson (2001) asks why researchers would choose to limit themselves to a single case when one of the biggest advantages of this method is its ability to accommodate multiple ones. Ultimately, a narrow focus is good for constructing a thorough and intricate evaluation of an event that might add something valuable to the existing collection of insights (Alkrajji, 2012; Irani, 1998).

A multiple case study approach is suitable for research which attempts to construct new theories, particularly if they are compatible with cross case analysis (Alkrajji, 2012; Jackson, 2001). This is an essential advantage if the final theory is ever going to be convincing on a large scale. Multiple case studies were utilised in this research to investigate specific theoretical ideas and construct an interpretivist paradigm to investigate how knowledge can be mobilised through a set of knowledge networks to support decision making. It is important to note that there are no real guidelines for deciding how many case studies to deal with at one time (Irani, 1998). Therefore, researchers are expected to make sensible decisions based on the requirements of their study. For instance, the ideal amount of cases is dependent on how much information there is about the event or phenomenon at the outset, as well as what kind of insights could be discovered by involving multiple cases (Yin, 2015; Wilkins & Dyer, 1991). On the other hand, investigation of a phenomenon requires a minimum of four and no more than ten cases (Eisenhardt, 1989). It has been further explained that the more cases that can be rationalised to build or synthesis a theory, the more robust are the research outcomes.

Typically, six to ten cases allow the researcher to achieve literal replication and to peruse other patterns of theoretical replication. However, if the case results show a numerous of totally different outcomes, further research will be required. This is because the nature of the propositions of the research need to be substantiated so rethinking the propositions is essential (Rowley, 2002). Multiple case studies are used to boost the comprehensive understanding of

certain populations via repetition (Yin, 2015; Eisenhardt, 1998; Meredith, 1998). Furthermore, the primary benefit of the multiple-case study approach is its ability to present efficacious evidence resulting in a sounder research design (Yin, 2009).

When performing a case study research, as highlighted by Eisenhardt (1989), each case is identical to an experiment and multiple cases are identical to multiple experiments. The multiple case approach enables the researcher to devise pattern-matching and replication through the application of cross-case comparison and analysis (Yin, 2009; Eisenhardt & Graebner, 2007; Eisenhardt, 1991; Eisenhardt, 1989). When the decision has been made that a research will make use of multiple case design, the next step is to establish the number of cases to be analysed. Thus, multiple case studies were employed to investigate knowledge mobilisation through a set of knowledge networks in IT projects to support decision making as this required a number of organisations to gain an understanding of different sets of knowledge networks.

3.5.5 Case selection criteria

When selecting cases in a case study research context, criteria differ when compared with survey research criteria. As a result of the limited number of cases to be examined in the former, some suggest using polar samples to facilitate the identification of emerging patterns (Yin, 2009; Voss et al., 2002). Cases are chosen in line with their ability to provide a theoretical contribution whereas, in survey research, individuals are chosen to ensure a population is represented (Yin, 2009). Upon performing case studies, the case composition needs to enable the research to devise the most appropriate replication design to facilitate best fit (Yin, 2009). With this noted, it is important to highlight that too many differences across subjects could cause problems in establishing the emergence of similar patterns. On the other hand, too many similarities can result in problems when performing cross-case analysis (this is explained in Chapter Four) as all subjects are seen to have similar patterns (Yin, 2015; Yin, 2009). For more details, please refer to section 4.4.

3.5.6 Justification for the choice of holistic design of case study

Case studies comprise two common dimensions: holistic or embedded studies. Holistic case studies investigate the case as one unit where the focus may rest on broader issues (i.e. organisational culture or strategy). This dimension offers “a helicopter view of the case”

although any change in the unit of analysis itself could influence the appropriateness of the overall research design. Another dimension is the embedded study which classifies a set of sub units each of which is examined separately; eventually, results from all units are combined to lead to overall results. However, this approach cannot deliver a holistic perspective from the analysis of the sub-units (Rowley, 2002). For this reason, this research utilises a holistic case design for the research using a single unit when analysing individual cases. Here, multiple cases were studied and a single unit of analysis was indeed selected for each case while every firm had a single unit of analysis and cross-analysis was also undertaken among them. As a result of the single unit of analysis per firm, when comparing different firms to assess similar situations and indirect reproduction to compare different contexts, direct replication was used. Figure 3.4 presents the design of the holistic approach selected.

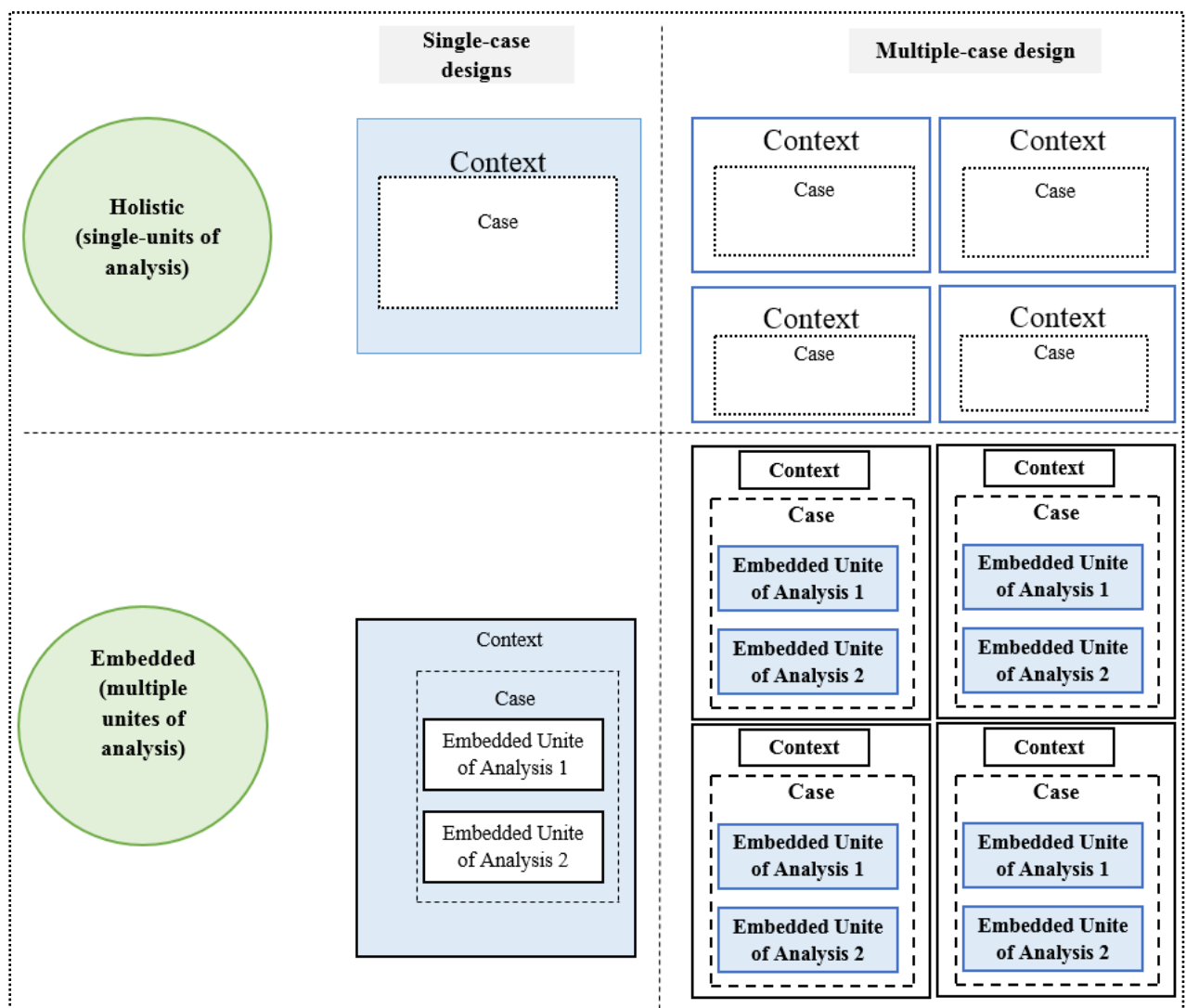


Figure 3.4: The holistic approach selected for this research (source Yin, 2009).

3.6 Research methods

This section presents what were the systematic qualitative data collection and analysis methods employed in this research and why they have been selected over the other methods. Figure 3.5 demonstrates the research instruments used in this qualitative study.

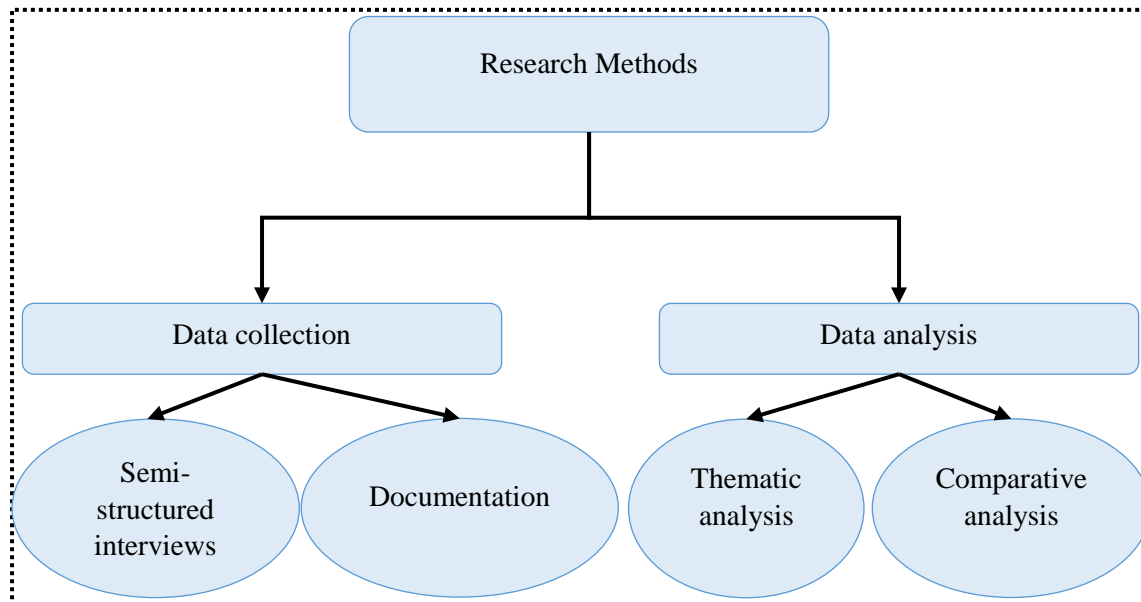


Figure 3.5: The research methods adopted

As outlined in the previous sections, a broad range of sources can be utilised as evidence in a case study. They include interview sessions, physical objects, administrative papers, and publications (Yin, 2003, p. 83-106). The employment of several different data collection techniques actually reinforces and adds weight to any discoveries made by the researcher (Themistocleous, 2002). Nonetheless, most case studies focus on documentation and interview sessions involving direct communication with participants (Creswell & Poth, 2017; Yin 2015; Myers, 1997). Accordingly, documentation and semi-structured interviews were utilised for the purpose of this study.

The semi-structured interview method was chosen over other data collection methods such as observations and focus-group for various reasons. Firstly, semi-structured interviews allow the researcher to engage with interviewee to confirm the existing knowledge and reveal possible new themes. Secondly, one to one interview provides more freedom in expressing and discussing topics, whereby interviewee can share their experience and knowledge without distraction from their peers or managers (Yin 2015; Longhurst, 2003). Thirdly, conducting one-

to-one interview allows to obtain rich data regarding specific projects, this is important in this research as most of the participants are project managers (McAdam & Galloway, 2005). Further, the semi-structured interview encourages the interaction between the interviewer and interviewee to clarify a certain point or deliver new ideas on the topic (Creswell & Poth, 2017; Creswell, 2012). It also provides multifaceted discussion over questions (i.e. what, how and why) towards aspects of KNs and knowledge communication channels, whereby several issues and suggested solutions can be revealed (Saunders et al., 2009).

For a case study strategy, documentation should always be a key source of evidence. In fact, it is a highly effective way to supplement and substantiate the evidence taken from other sources. There are three justifications for needing further substantiation and supplementation. These are: establishing the scene for interview sessions and conversations, confirming the details of organisations, and acquiring precise insights which can verify the verbal information given by participants (Yin, 2003, p. 83-106). Documentation can take many forms: accounts of events, newspaper articles, letters, archival records, etc. This degree of variance means that researchers should make clear decisions about what kind of evidence they are going to utilise; often, it is more useful to identify what sort of content is inadmissible. For example, a broad range of documents were acquired for the purposes of this study, but they had to be easily accessed. They included everything from information strategic plans, IT project portfolios, comprehensive reports for project evaluation (including the current state of analysis), requirements, future directions, project executions, and post-project implementations. In addition, the official websites for all of the organisations were scrutinised and used as a primary resource.

The two methods (thematic and comparative) were selected for two main reasons. Firstly, thematic analysis was useful for within-case analysis whereas comparative analysis was useful for cross-case analysis (Tharenou et al., 2007; Dawson, 2002). Thematic analysis is one of the approaches utilised when examining qualitative data; focus is directed towards patterns, themes and subjects, with emphasis being placed on recording, examining, emphasising and highlighting data patterns (Yin, 2015; Braun & Clarke, 2006). Comparative analysis has a close link to thematic analysis (Dawson, 2002). When applying this form of analysis, data from different people can be contrasted and compared until the researcher believes that all issues have been identified. The two forms of analysis are commonly applied in unison in any one project, with the researcher progressing back and forth between research literature, notes,

memos and transcripts in an effort to ensure the themes identified through thematic analysis can be confirmed and validated (King & Horrocks, 2010; Dawson, 2002).

3.7 Research validity and reliability

The efficacy of a research study needs to be determined according to the paradigm in which it is undertaken (Healy & Perry, 2002) so a string of commonly accepted tests was utilised to determine the appropriateness and soundness of the research (Yin, 2009). The four-phase test has been widely used to check the quality of any empirical social research (refer to Table 3.2). The test comprises four components which are: construct validity, interval validity, external validity and reliability. In terms of construct validity, identifying proper operational measures by using multiple sources of evidence, as well as reviewing reports from experts, allows this criterion to be met (Yin, 2009). The researcher asked the key informants to review the conceptual framework and recorded their feedback accordingly. Internal validity was considered through establishing causal relations across the findings, addressed different practices; this can be seen in Chapters 4 & 5. The external validity of this research was tested by using replication logic in multiple case studies. Research reliability issues were taken into account when establishing a set of procedures before data collection, during the gathering of the data, and following the 15-Point Checklist of Criteria for Good Thematic Analysis (15 CCGTA see Appendix E) (Yin, 2009; Braun & Clarke, 2006).

Table 3.2: Criteria for judging the quality of research validity and reliability (Yin, 2009)

Criteria	Task	Tactics	Stage of research
<i>Construct validity</i>	Identifying correct operational measures for the concepts being studies	* use multiple sources of evidence * establish chain of evidence * have key informants review draft case study report	Data collection & composition
<i>Internal validity</i>	For explanatory or causal studies only, not for descriptive or exploratory studies): seeking to establish a causal relation (how and why event X leads to event Y), whereby certain conditions are believed to lead to other conditions, as distinguished from spurious relationships.	* do pattern matching * do explanation building * address rival explanations * use logic models	Data analysis
<i>External validity</i>	Defining the domain to which a study's findings can be generalised.	* use theory in single-case studies * use replication logic in multiple-case studies	Research design
<i>Reliability</i>	Use case study protocol	data collection procedures – can be repeated with the same results	Data collection

By utilising the various criteria seen above, several techniques were used to boost the work's reliability and validity. The study, as can be seen, assumed a structured method to utilise and adhere to certain techniques throughout the various phases of the research, thus guaranteeing validity and reliability. Construct validity can be amplified via an evaluative form of pattern matching which involves a dual technique which combines cross cases and thematic analysis for the purposes of interpreting qualitative data, as employed in this research. However, it is also possible to raise the level of construct validity by allowing one or several experts (study subjects) to give feedback on early versions of the case study and its findings. After the data analysis is complete, the researcher passes the results on to a number of people from the study sample. They are encouraged to appraise the case study and make suggestions for improvements where necessary. This is a helpful way for the researcher not only to receive objective feedback on the results, but also to test further the constructed framework and consider different ways of developing CMKNM. This delivered greater understanding of knowledge networks and mobilisation to support decision making in IT projects. Such a session

was conducted with relevant informants. The researcher also employed a folder and filing management system which ensured that all documents and reports were easy to access and utilised in the right way. To guarantee the accuracy of the study's findings, Yin (2003, p.33-39) explains that a researcher must adhere to the same methodologies and practical steps as previous investigators. This is especially important if a researcher is trying to prove or test the validity of earlier findings. The purpose of construct validity is to eliminate, as far as possible, inaccuracies and biases which have the potential to affect their value.

3.8 Ethical considerations

Ethical issues were a major concern for the researcher and therefore it was ensured that this research met the required standards with regard to the ethical guidelines contained in the checklist published by Plymouth University. In both interviews and documentation, the confidentiality of the participants was considered and all the participants were aware of the purpose of the research before they agreed to participate. Additionally, all the responses collected were kept safely and the interviews were confidential. Based on an agreement between the researcher and the interviewees, all the responses were anonymous and the recorded interviews are to be destroyed thereafter. Please see appendix B for further details.

3.9 Summary

This chapter discussed various underpinning philosophies of this research, as well as the repercussions of the methodology selected, the means of guaranteeing research quality, and to address various justifications. A number of research philosophies were explained. Choices were made with regard to the nature and the character of the study, as well as the questions posed by it. Ultimately, the epistemology of interpretivism was seen to be most relevant to the nature of this research. A qualitative research approach was selected to answer the research questions and reasons were given as to why this was deemed the most suitable approach over others. Research design was discussed to ensure that a suitable research strategy was employed to fulfil the aim of this research and answer the research questions. Thematic and comparative data analyses were detailed to achieve the objective of this research while issues regarding research validity and reliability were explained.

Chapter Four Empirical data collection & analysis process

4.1 Introduction

This chapter explains the process for empirical data collection and data analysis. In the previous chapter, justification over the selected data collection and analysis methods was discussed. This chapter explains how various data collection and analysis methods were applied during the research to obtain the answers to the research questions. This chapter begins by describing the use of semi-structured interviews method. Following this, sampling technique utilised for the study was explained. Then, it moves to explain the development of an interview template and process of conducting interviews. After that, documentation as a data source was described. Finally, the data analysis approach was discussed in detail.

4.2 Semi-structured interviews

Research interviews which tend to be used in qualitative work can adopt one of three different forms: structured, semi-structured and unstructured (Creswell & Poth, 2017; Gill et al., 2008). The aim of semi-structured interviews does not only centre on receiving answers to ‘yes’ and/or ‘no’ questions but rather on establishing an in-depth picture and overview of an incident, in combination with more in-depth explanations of actions and activities. The use of open-ended, semi-structured interviews enabled the author to deepen the study’s analysis by posing follow-up and more probing questions, depending on the availability, convenience and schedule of each interviewee as explained in section 3.6 (Yin, 2015; Gill et al., 2008).

In the case of semi-structured interviews, the researcher has a number of questions and themes to be covered; however, these might differ from one interview to the next. This could mean there is a need to omit various questions in certain interviews when considering a particular organisational context experienced in relation to the study topic. The order of the questions also might need to be changed in line with the conversation; in contrast, however, further questions might be posed if necessary, which could help in investigating the research objectives and questions considering the nature of events within a particular organisation.

The nature of the research and its terminologies were explained through a one-to-one interview session with the aim of enabling the interview to be carried out in an effective and efficient way (Yin, 2015; Saunders et al., 2009; Tharenou et al., 2007).

4.3 Documentation

For a case study strategy, documentation should always be a key source of evidence. In fact, it is a highly effective way to supplement and substantiate the evidence taken from other sources. There are three justifications for needing further substantiation and supplementation. These are: establishing the scene for interview sessions and conversations, confirming the details of organisations, and acquiring precise insights which can verify the verbal information given by participants (Yin, 2003, p. 83-106). It is also true that documentation-based evidence can take many forms: accounts of events, newspaper articles, letters, archival records, etc. This degree of variance means that researchers should make clear decisions about what kind of evidence they are going to utilise; often, it is more useful to identify what sort of content is inadmissible. For example, a broad range of documents were acquired for the purposes of this study, but they had to be easily accessed. They included everything from information strategic plans, IT project portfolios, comprehensive reports for project evaluation (including the current state of analysis), requirements, future directions, project executions, and post-project implementations. In addition, the official websites for all of the organisations were scrutinised and used as a primary resource.

Some documents were briefly analysed before the interviews were conducted in order to generate the overall concept that would be discussed during the course of interviews. Document analysis was also triangulated with the interviews to strengthen and validate the findings. The criteria for selecting appropriate documents lie in their preliminary assessment with the relevant support from participants, their accessibility and relevance, and how such sources are related to the results that have already been identified. Second filter method was to eliminate efficiently all unrelated sources and avoid a 'cherry-picking' approach. Thus, project portfolios, project reports, business process documentation, functional specifications of existing systems' reports, benchmarking documents, requests for proposals and information, and websites were considered.

4.4 Sampling technique

A number of sampling methods are highlighted as viable in the literature, with various procedures and roles inherent in each. Were it possible, it is not necessary that data should be gathered from all individuals in a given population in order to establish validity; only a sample is necessary. The research objectives and the characteristics of the study's population establish how many and which individuals should be chosen. Accordingly, this section considers the most commonly utilised methods in qualitative research: purposive sampling, quota sampling and snowball sampling. As gatherers of data in this context, it is essential that an appropriate method is chosen so that it is well aligned with the research aim and is able to satisfy the research's objectives and questions (Yin, 2015; Mack et al., 2005).

One of the most commonly utilised sampling approaches is purposive sampling; this method takes participants and groups them according to pre-defined criteria relevant to a specific study. Sample sizes, which might be fluid or fixed before the data collection stage is carried out, depend on the time and resources available, in addition to the objectives of the study. Furthermore, purposive sample sizes are commonly established in line with theoretical saturation. Accordingly, this method of sampling is considered most valuable when there is a data review and analysis in combination with collection (Yin, 2015; Mack et al., 2005).

Another common sampling technique is that of quota sampling. During the process of study design, the decision is made as to how many individuals with a certain list of characteristics should be included as subjects; traits might include class, profession, gender, place of residence, age or marital status, for example. The determined criteria enable the researcher to focus on the individuals who are considered to be best positioned to provide answers to the research questions. Subsequently, researchers delve into the community and, through the application of recruitment strategies deemed most suitable to the culture, location and study population, identify those individuals who fit the criteria until the necessary quota is satisfied (Mack et al., 2005).

Quota and purposive sampling methods have similarities in the sense that they both aim to establish subjects in line with specific criteria; however, the former approach is viewed as being more focused regarding subsample proportions and sizes, with subgroups selected in order to highlight corresponding proportions in the population (Mack et al., 2005).

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Another form of sampling, as mentioned above, is snowball sampling, which also might be referred to as referral sampling. Through the completion of this method, subjects or informants, with whom contact has been established, exploit their own social networks in order to refer the researcher to other possible subjects of interest that could provide valuable information to the study. In this vein, snowball sampling is commonly used to identify and recruit ‘hidden populations’; in other words, populations not always accessible to researchers through the use of other sampling strategies (Creswell & Poth, 2017; Mack et al., 2005).

In line with the above, qualitative sampling aims to choose a particular sample of participants that would be valuable in providing detailed data to facilitate the answering of the research questions (Miles & Huberman, 1994). The decision as to which sampling method to employ ultimately rests on the objectives, research questions and study strategy, with the sample needing to provide the researcher with rich data that allows the exploration of the research questions and the garnering of understanding of the study’s field (Saunders et al., 2009; Teddlie & Tashakkori, 2009). As such, the research objectives and questions affect the sample size. In particular, the sample size has an influence on credibility, research use, what can be done with the resources available, and the degree of precision and accuracy that can be achieved (Creswell & Poth, 2017; Patton, 2005).

Thus, the researcher targeted at project managers, project teams and stakeholders, whilst interviews were completed with any individuals seen to satisfy the research criteria. With this taken into account, purposive and snowball sampling were adopted to establish participants. Furthermore, purposive and snowball samples were derived to determine all those individuals responsible for knowledge network practices in IT projects. For this research, seven businesses were chosen for involvement in the study. A number of different data collection methods, such as documentation, along with the completion of semi-structured interviews, were implemented to gather the necessary data.

The researcher aimed to establish different perspectives where each case study could be involved in particular knowledge networks, as well as to explore how knowledge and information are transferred across the IT industries within a project. Moreover, the researcher also sought to establish the various challenges and a new innovative strategy for structuring knowledge networks. This is pivotal in considering different knowledge network practices across the industry; it also aims to identify the differences and similarities between cases concerning such perspectives. For example, although some cases highlighted the adoption of a

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knowledge map system aimed at clearly monitoring such knowledge in the project management and IT industry, others stated that no formal approach in this regard had been adopted. This was because the practice depended on individual leaders, managers and system experiences or the behaviours of peer organisations to examine the most effective system-building setting. This might occur through the sporadic use of ad-hoc techniques and tools in response to the experiences of particular management. Nonetheless, analysis of the empirical data cannot be viewed as a contrast between various cases; rather, it facilitated a more solid foundation for the findings and enabled other potential themes to be identified in devising an empirical and holistic framework that could enable others to align their own views with the research outcomes (This is explained in more detail in Chapter 5).

With regard to the respondents needed for the sample, there is no predetermined number. Yin (2003) states that researchers usually reach saturation after interviewing 8 participants. Nonetheless, in order to ensure commonalities in the collected data, the data gathering process was completed over an 18-month period, broken down into two stages. The context for data collection was the KSA, with the sample comprising a total of thirty-four (34) individuals from 7 large-scale organisations, including private local companies, public organisations in the IT project field, and leading international companies, as well as experts and professionals from consultancy-based firms (see Table 4.1). For more details about the selected organisations please see Appendix D. Table 4.1 illustrates the organisations investigated in this study, their main business focus and the interviewees' job roles in each organisation. The number of staff members is based on the findings in their official websites or hard copy obtained. The names of the organisations were anonymised and abbreviation was given to follow the guideline of the research ethical aspects (see section 3.9).

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Table 4.1: Overview of the organisations and participants

	Case Studies	Abbreviations of organisations' name	Organisations (main business focus)	Interviewees	Number of staff members
1	International company	A	Culture of partnership with a strong commercial focus	1- The head of project office 2- Project manager 3- Business analysis director 4- IT consultant 5- Total quality director	180K
2	International company	B	Industrial Services Company	6- Project manager (specialising in health care projects) 7- Project manager (specialising in national services projects) 8- Project manager (public O)	150K
3	Local Company	C	Information Technology services	9- Chief executives 10- The head of project office 11- The head of IT services 12- Project manager	500
4	Local Company	D	Information Technology services	13- Knowledge management officer 14- Strategic management director 15- The head of project office 16- Project manager (specialising in public organisation)	700
5	Public Organisation (Project Centre)	E	E-services projects and programmes	17- Strategic management director 18- The head of knowledge management office 19- The director of public organisation e-services 20- The head of project office 21- Project manager (specialising in internal projects) 22- IT project consultant	500
6	Public Organisation	F	Information technology services and regulations	23- The director of IT services 24- The head of project office 25- The head of business strategy and development office 26- The director of communication office 27- Information officer	300
7	Public organisation	G	Governmental E-services	28- The assistant of general manager 29- Organisation's consultant 30- Project manager (specialising in IT project between public and private organisation) 31- Project manager (specialising in data centre projects) 32- Project manager (specialising in projects program management and analysis)	1200
8	Experts have been involved in multiple projects consultancy	Consultants	IT projects and IT services and regulations consultancy	33- Vice president 34- Chief executive	

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The study adopted two sampling methods, namely purposive and snowball. The former was conducted in the earlier stage to establish initial participants responsible for IT projects regarding evaluation, executive roles, implementation and post-implementation, and the latter to identify further informants (Dubois & Araujo, 2004). The selected international companies were advised by Saudi experts in IT projects alongside international experts and the companies' profiles through their websites were revised in order to gain insight into their IT projects and practices. Their services varied from being hardware vendors, software designers, evaluation and innovation businesses, process and structure consultants, change management services and IT projects (initiation, planning, implementation, evaluation and operation). Local companies were selected as advised by Saudi experts, and the international companies as practising IT project implementation, engaging in partnership activities, and acting as intermediaries between international companies and public organisations. The chosen public organisations were chosen based on three main criteria: 1) implementing large IT projects; 2) engaging in national IT project committees; and 3) advanced practices in IT Projects.

To sum up the criteria, these are outlined as follows:

- Companies with more than 5 years' involvement in business evaluation, consultancy, IT projects, and restructuring;
- Companies with ongoing interactions between decision makers (i.e., providers and users) in order to examine issues relating to collaborative practice;
- Companies with a reputation in terms of IT practices (this was achieved through different means such as via organisations' websites, visiting IT centres in person, and talking to the experts in the area).

4.5 Empirical data collection

Semi-structured interviews have been conducted to gain rich data from participants who involved in IT project knowledge exchange networks. Human aspects and key actors within such KNs need to be carefully managed in order to mobilise knowledge across various parties. This is seen fundamental in IT project management to maximise the success (Sedera & Gable, 2010; Chan et al., 2009).

Since this study's main focus is on the development of KNs to understand how knowledge can be mobilised through various networks alongside their connections, the researcher attempted

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to understand these KNs from various angles. For example, as explained in Chapter Two, KNs were identified based on the SECI Model that explains how tacit knowledge is converted to explicit knowledge through four dimensions (socialisation, externalisation, internalisation and combination).

Throughout the study, the researcher evaluated the framework of CMKNM across different phases (theoretical and empirical) to insure examining the validity of the existing elements, introducing new elements or eliminating existing elements. This was done throughout the course of revising the literature, examining the findings by conducting the semi-structure interviews and doing a course of documentation analysis.

The empirical investigation of the CMKNM elements began by eliciting expert experience within KNs in IT projects. This was employed to construct KNs which needs in depth understanding of the correlation between building knowledge networks and connecting variety of organisation's assets such as knowledge, experience and "lessons learnt" in order to mobilise knowledge (Müller, 2017). Thereby, it would also be able to shed lights onto various practices towards KNs from different industry practitioners.

The protocol agenda for conducting the interviews can be seen in table 4.2. The table illustrates the procedures used including the pilot study, selecting organisations and getting access permission etc. Another part of the table explains aspects involved to carry out the empirical study.

Table 4.2: The protocol agenda for conducting the interviews

Protocol Steps	Research Outline
Procedures Used	<ul style="list-style-type: none">▪ Pilot study in June 2013▪ Selecting the appropriate IT project organisations▪ Getting access permission in August 2013▪ Identifying the appropriate sampling technique▪ Scheduling the site visit and interview times from mid-June 2013 to the end of November 2014▪ Using a recorder device for the interviews▪ Collecting all the necessary information and data▪ Developing a technique for managing, storing and retrieving all the textual material
Case Study aspects	<ul style="list-style-type: none">▪ Interview agenda including general information, organisational factors, knowledge networks, initiation in IT projects, factors influencing knowledge channels and knowledge networks factors (environmental and critical)▪ Transcribing all the recorded interviews into MS Word 10 documents▪ Using a Computer Assisted Qualitative Data Analysis Software (Nvivo) application for analysing the collected fieldwork data

4.5.1 Development of interview template

Through the completion of a wide-ranging literature review, a conceptual framework has been devised to guide empirical research. An interview template was developed which has a set of questions. The questions were generally guided by the literature review to provide initial discussion points and leave a large space for the participants to express their views into KNs aspects (Yin, 2015; Flick, 2009).

The interview template was designed to potentially add new issues and confirm or disconfirm partially the first research question and further provide an answer to the first and second research questions. Its main focus is on investigating KNs in terms of how they are interacted, their connections, knowledge channels and how they connect declarative knowledge to procedural knowledge (Jashapara, 2011; Levesque & Works, 2010; Cooper, 2010; Hislop et al., 2000). Thus, the interview template includes five main areas of discussion, namely general organisations information, organisational factors affecting KNs and KMob, KNs initiated the idea of leading multiple IT projects, knowledge channels and the role of knowledge actors. Under each area, there is a set of questions to cover and allow participants to explain in more

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details if needed. The questions were designed to investigate individual knowledge network elements in establishing KNs to obtain answers of what, why and how.

In total, 20 main questions were provided. The interviews were translated into Arabic and checked by Arabic specialists in the field of information science to ensure the meaning. Though all participants speak English fluently, some technical terms were explained when needed. The interview template was checked by academic professional from Plymouth University and a pilot study was conducted in June 2013. Terminology was prepared beforehand to ensure the clarity of the content. The interview template can be seen in Appendix C.

4.5.2 Conducting interviews

The interviews were conducted over a period of approximately one year and half started from June 2013 and finished at the end of 2014. The researcher provided the consent form to each interviewee beforehand to have a look at it and agree to commence the interview. The permission of audio recording was also discussed beforehand and the researcher took their privacy issue into consideration. The audio files for each interview were transcribed into MS documents word for word. Such technique was utilised to reduce bias whilst increasing the reliability and validity of the research findings and evidence. The researcher made assurance to follow the university academic ethical policy regarding privacy and confidentiality of participants. The researcher conducted face to face interviews at participants' workplace which the participants preferred. The researcher made sure that all interview questions were covered in addition to some emergent questions depending on how the dialogue went. The participants were from different cities, background, countries and culture, these aspects were planned beforehand. Most of the participants were welcoming and agreed to be contacted in future if the researcher needed more clarification.

4.6 Data analysis process

Thematic and comparative analysis methods were used when examining the qualitative data garnered from the semi-structured interviews and the documentation. Upon coding and categorising the data using thematic analysis, the themes were identified. The two analysis methods are recognised as the most appropriate for this particular study; these are detailed below.

4.6.1 Thematic and comparative analysis

Thematic analysis is commonly centred on experience-focused approaches. Throughout the course of the analysis, the researcher established various themes by taking into account three stages, as noted in the work of King & Horrocks (2010):

- Descriptive coding (first-order codes): those parts of the transcript data providing answers to the research questions are identified, with descriptive codes allocated throughout the whole transcript.
- Interpretative coding (second-order themes): descriptive codes that seem to share some common meaning are grouped together, with an interpretative code created to capture this.
- Defining overarching themes (aggregate dimensions): various overarching themes characterising key concepts in the analysis are identified by the researcher.

Importantly, the second-order themes were established with the use of the first-order themes. These were categorised as dimensions in an effort to highlight knowledge network issues and the ways in which knowledge is mobilised across IT industries within a project, as well as the various challenges and issues, and the new innovative strategy to structuring knowledge networks. This is pivotal when reviewing and examining network practices in the field with the aim of establishing the differences and similarities inherent between cases with regard to such perspectives. In line with theme analysis and categorisation techniques, as highlighted in the 1994 work of Miles & Huberman, the researcher reviewed the interview transcript several times, implementing coding in line with the phrases or terms used by the subjects.

The thematic analytical framework utilised for this study was based on a set of protocols and guidelines (refer to Figure 4.1) (Braun & Clarke, 2006).



Figure 4.1: Phases of thematic analysis

The guidelines include six phases, contributing to the understanding of the study's data, the construction of early themes and classifications, the evaluation of proposed themes, the definition of themes, and the drawing up of reviews and reports. To gain an in-depth understanding of the data, the researcher became personally and professionally associated with data. Thus, the study began with personal knowledge, networking and judgements. Most of the audio recordings were translated into English before being transcribed into textual sources (using Microsoft Word). Transcription is 'a primary aspect of data evaluation for qualitative analysis. The process is quite a meticulous one so the researcher committed a good deal of time to scrutinising the nature and significance of the data. The transcription process was an excellent opportunity to become familiar with the opinions of subjects and start working out how to extract value from them (Bird, 2005, p.227).

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According to Braun and Clarke (2006), it is important to use as many different themes and classifications as possible, so the researcher devised a lengthy series of topics and ideas. Variety is important at this stage because there needs to be enough flexibility to focus on targeted issues, even if they are not deemed a priority at the beginning of the study. However, the actual classification of themes and ideas began only after the researcher felt a reasonable understanding of the data had been reached. To achieve this, rough drafts of classification codes and thematic arrangements were constructed. For example, the researcher made notes about the key ideas discussed during the interviews and linked to them any interesting questions or concerns.

The actual thematic coding was carried out using Computer Assisted Qualitative Data Analysis Software (CAQDAS). Specifically, the NVivo 10 program was utilised. It was selected after a careful consideration of the study objectives, personal preferences and practical consequences (Thomas, 2006). First, valuable segments of text were assigned to predefined classifications or groupings. When identifying themes, it was necessary to readjust the evaluation from a wider perspective. After attaching codes to each of the text segments, they needed to be allocated to a thematic grouping or classification. E-draw software is a visual tool which helped the researcher to achieve this. The visual interpretation of this procedure was then employed as a way of determining whether the collated codes for each thematic grouping could be used to construct a logical progression. Each theme was considered carefully in terms of its value in the broader data set, and its similarity to the ideas and concepts discussed at earlier points in the study (Braun & Clarke, 2006). The process was complete when a series of relevant themes and sub-themes had been reviewed and refined.

Following this stage, the researcher devised a series of candidate themes. Once again, they were further developed from two perspectives. The two-stage process was designed to ensure that all the approved codes and themes were meaningful to the study and the research queries. Firstly, the researcher reviewed all the codes allocated to each theme and determined whether they could be used to form a logical progression or thematic sequence. In some cases, the theme was conflicting or it did not make sense within its broader grouping. Therefore, a new theme was then devised to fit the code or was omitted from the evaluation. Secondly, the themes themselves were reviewed. The significance and value of each was considered according to its importance for the data set and whether it represented the wider ideas discussed in the interviews.

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The result of the thematic review was a comprehensive thematic map. After it was completed, each theme could be further scrutinised and developed to fit the needs of the study. This stage was designed to clarify two key aspects of the work; (a) what each theme principally referred to and (b) what elements of the interview data the theme was relevant to. To do this, the researcher had to return to the thematic codes and arrange them into a logical and internally interpretable explanation with its own descriptive narrative. Every theme was given a story that was compatible with the wider narrative created by the research questions as a whole (Yin, 2015; Braun & Clarke, 2006). Upon completion of this stage, the significance and meaning of each theme had to be very precisely defined and understood. Finally, the framework CMKNM was developed into the evaluation stages, by integrating and summarising the empirical results. Since there was a high volume of interview data (see Figure 5.2).

The comparative analysis has been utilised in this research to establish casual relationships by using systematic comparison between the seven cases. For example, the researcher analysed the data based on the similarities and differences between the cases to highlight such circumstances in common to provide the cause or effect of the given phenomenon (Roig-Tierno et al., 2017). Another example, the second-order themes established through thematic analysis were confirmed using comparative analysis; in this instance, comparative analysis was used to confirm the identification of knowledge networks and how these can be linked to mobiles knowledge across boundaries and what are the factors affecting knowledge channels. The researcher might already have had a list of groups or otherwise the researcher may have allowed the categories to emerge from the data (Dawson, 2002).

4.6.2 Integrating thematic and comparative analysis methods

When concluding thematic analysis, the most common approach is to explain and discuss all overarching themes one at a time. Then, examples are provided from the data and quotes are used to characterise themes. In this vein, Braun & Clarke (2006) pointed out that thematic analysis compilation is concerned with not only providing a descriptive summary of the theme's content, but in establishing a narrative that communicates to the reader how further insight into the issue has been established as a result of the research findings. Furthermore, it is noted in the work of Symon & Cassell (2012) that, regardless of the approach selected, direct quotes made by participants should be used; these can be short in order to facilitate understanding of particular points of interpretation whilst more in-depth passages could give the reading audience greater understanding of the original texts.

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The thematic analysis was employed to extract as many different themes and classifications as possible (i.e. organisational factors, knowledge networks environmental and critical factors, factors influencing knowledge channels etc.). This was achieved by allowing such themes via rough drafts of classification codes and thematic arrangements were constructed. The comparative analysis employed to examine the set of themes across the seven cases to strengthening the evidence, highlight the similarities and differences between the cases. It also examines the frequency with which a specific second-order theme is referred to across the data. For instance, data underwent coding in line with common themes, whilst a secondary external coder with a wealth of qualitative research experience was involved in the role of evaluating the coding's reliability (Rihoux & Ragin, 2008). Whenever there was a disagreement in the coding, discussions allowed resolution.

4.6.3 Document analysis process

Similar to other collection and analytical methods in qualitative research, document collection and analysis involves criteria of selection, examination and interpretation methods. The purpose of conducting documentation method in this research is to systematically commence evaluation over the CMKNM alongside the semi-structured interview results. Documents offers supplementary data that can be valuable in addition to the already identified results from the semi-structured interviews (Bowen, 2009).

Once the researcher accomplished the analysis of the semi-structured interviews, the documentation analysis began. The documents were collected during the time of conducting the interviews using purposive and snowball sampling. Documents collection process is time consuming and cannot be without constraints. Such constraints includes the accessibility, confidentiality and issues of Information sensitivity (Flick, 2014). The researcher has taken these issues into account and committed to keep the highest level of research ethics. The permission was provided beforehand and the agreement was place upon the use of the research purpose only. The researcher has developed processes and guidelines to help in securing access to sensitive and confidential documents. From seven organisations, only three organisations agreed to provide and emphasis has been put upon confidentiality and purpose of use. Two more organisations supplied two leaflets. The researcher made attempts to collect documents from the seven organisations. However, some of the participants were not able to provide documents. The documents were supplied from the international company (A), private local company (C) and government organisation (E). The researcher believes to have taken

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appropriate sample for several reasons. First, in the semi-structured interviews analysis, the organisations are grouped into three groups that are international companies, private local companies and public organisations. This is because each group is different at many aspects such as industrial context, KM and PM practices and the main business focuses. For example, international companies tend to take similar approach towards managing knowledge in their projects which are different from public organisations. Second reasons is related to the accessibility which is one of the most complicated aspects that faces researchers. So the researcher believes to have taken a sample of each group of organisations. The table below explains details on what criteria used to select documents, which types of documents analysed, the scale of document analysis, procedures used to review and data analysis method (Table 4.3).

Chapter Four: Empirical data collection & analysis process

Table 4.3: Details on what criteria used to select documents (Flick, 2014, pp 254-259)

Criteria of selecting documents	<ul style="list-style-type: none"> • Relevance to the area of study and the research questions (i.e. KM, ChM, IT project and etc.) • Recent documents (last seven years to understand current issues since the use of KNs is recent) • Accessibility • Accuracy • The reliability of sources • Confidentiality • Compilation • The purpose of production
Forms of documents analysed	<ul style="list-style-type: none"> • Assessment of IT project reports • Change readiness report • Current state reviews • Implementation and communication report • Pilot report • Operational report • Websites of organisations and two leaflets
Procedures used to conduct document review	<ul style="list-style-type: none"> • Gathering background information • Seeking consultants to clarify industrial meaning (i.e. abbreviation, internal use terms, purpose of use and etc) • Identifying the content that is linked to the research questions, by initial scanning
Data collection technique used	<ul style="list-style-type: none"> • Online documents (website) • Hard copy documents were handed by the interviewees • Leaflets were collected from the stragic and planning department
Data analysis method used	Thematic and comparative data analysis methods
Computer Assisted Qualitative Data Analysis Software used	The NVivo 10
Number of documents collected as hard copies	13 documents
Number of organisations supplied the documents	3 plus two organisations supplied leaflets
Abbreviations of organisations' name that supplied documents	Company A (international company), C (privet local organisation) and E (government organisation)
Online documents used	All the organisations websites
Types and number of documents collected from each organisation	<ul style="list-style-type: none"> ➤ International company (A) <ul style="list-style-type: none"> ✓ Assessment of IT project report (1) ✓ Change readiness report (1) ✓ Current state review (1) ✓ Pilot report (1) ✓ Operational report (1) ➤ Privet local company (C) <ul style="list-style-type: none"> ✓ Assessment of IT project report (1) ✓ Current state review (1) ➤ Organisation E <ul style="list-style-type: none"> ✓ Assessment of IT project report (1) ✓ Implementation and communication report (1) ✓ Current state reviews (2) ➤ Organisation F & Privet local company D: One leaflet each

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As explained in the table above, thematic and comparative analysis methods were employed. The codes identified from the interview transcripts were applied to the documentation in order to reveal similarities and differences in the core concepts. Furthermore, patterns across the results were examined to generate potential new concepts (Dong et al., 2009). Figure 4.2 below explains the assessment approach used for analysing the documents. It starts by applying the procedure to search for relevant documents as explained in section 4.3. Once the researcher found relevant documents, the semi-structured interview codes applied. After that, the researcher started to evaluate related concept by revising, extracting underpinning concepts, generating sub-themes then finally producing themes. The outputs process includes three stages which are pattern matching, highlighting similarities and differences and eventually revealing the findings.

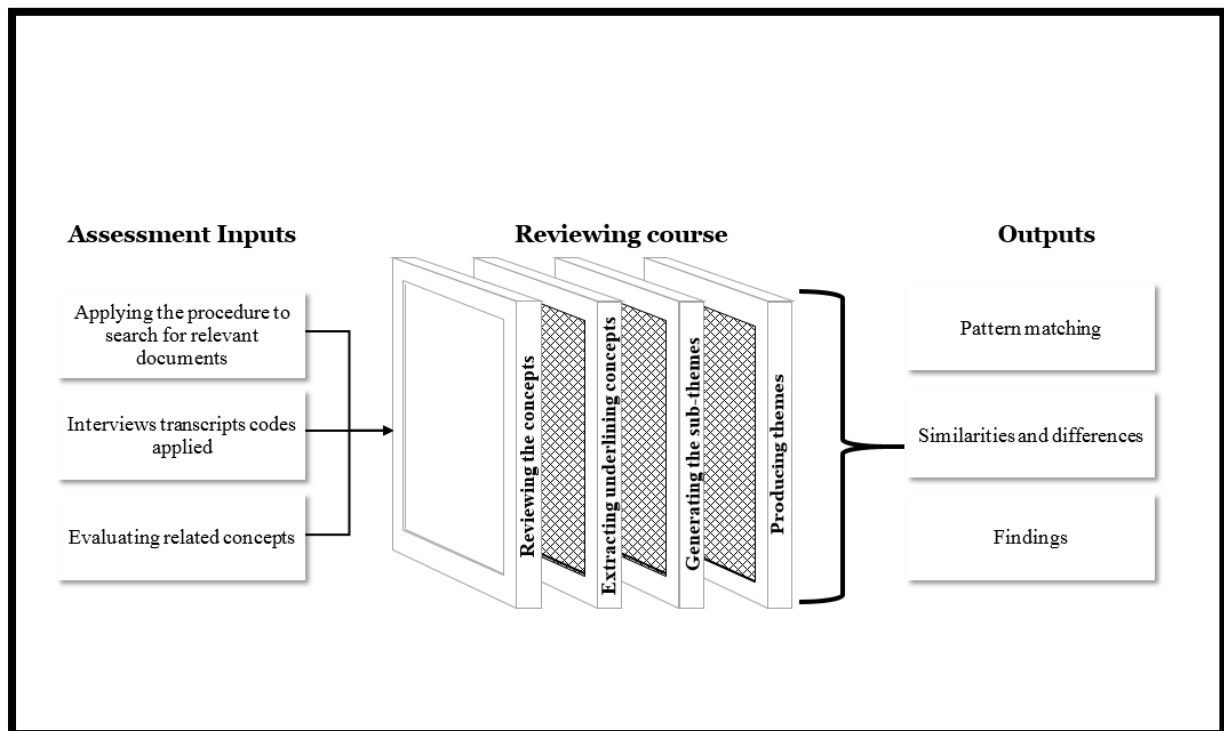


Figure 4.2: The assessment process of document analysis

4.7 Summary

This chapter discussed the empirical data collection and analysis process. It explained how the semi-structured interviews and documentation were applied. The judgmental and snow sampling techniques were empirically employed and explained. It discussed how the interviews templet was developed and how interviews were conducted. The use of thematic and comparative analysis was practically demonstrated to explain the meaning of identified codes. The integration of these two analysis methods facilitates further understanding into various practices (i.e. the similarities and differences among the cases).

Chapter Five Evidence and findings from the analysis of semi-structured interviews

5.1 Introduction

The case study's ultimate output could adopt the form of a refined framework; otherwise, it could be a midrange theory or merely a redirection to further research (Yin, 2015; Yin, 2011; Eisenhardt, 1989;). A new theory emerges only if specific patterns within and across cases provide an explanation as to the way in which different constructs are interlinked. Construct interactions are fundamental conditions when devising theory (Creswell & Poth, 2017; Eisenhardt, 1989). However, situations can arise where researchers fail to achieve their goals, meaning the study's outcomes are simply a duplication of other works, or do not facilitate the drawing of a conclusion as a result of a lack of a clear pattern identifiable in the data (Eisenhardt, 1989).

This chapter sheds light on the seven case studies (see Appendix D for the companies' background). Using an interpretive exploratory approach, as justified in Chapter Three, the researcher explains the findings by triangulating evidence from the semi-structured interviews and documentation (Chapters five and six respectively). This was done to reduce bias and increase the reliability and validity of the presented evidence. In addition, seven case study reports were provided to explain the main construct by connecting sample interview extracts to the main construct (see Appendix E). The reports were generated with the cooperation of the interviewees in relation to KM practices in IT project management. Although three of the reports were still unrefined data, they help the researcher to be familiar with the data so that the second process of data analysis can be enhanced. By doing this, themes and sub-themes, codes and nodes clustering and categorisation can be elicited effectively. Following this, the results were examined and the validity of the proposed framework was assessed using thematic analysis. Then, by using comparative analysis, as justified in Chapter Four, the researcher obtained the results based on the similarities and differences which existed among the cases. Through the description of the findings in relation to the similarities and differences, it was easier to identify possible emerging themes. Thus, a potentially valuable metric of proximity to network resources was developed and thus, the outcomes from this research will allow future research to test some of the propositions. The framework of CMKNM was devised throughout the course of the evaluating phases by integrating and summarising the empirical findings.

Chapter Five: Data analysis (semi-structured interviews)

Owing to the significant volume of interview data, the decision was made to utilise NVivo software in an effort to structure and organise the data, as this was recognised to facilitate the analysis process, thus circumventing oversights in the data.

The evaluation process of the CMKNM will be explained in details in the next sections and Chapter 6. However, the figure below illustrates the process of CMKNM evaluation across the phases (see Figure 5.1). It begun with the conceptual framework (theoretical phase). Following this, the empirical phase started by applying thematic and comparative data analysis methods to both the semi-structured interviews and documentation. The semi-structured interviews results revealed the evaluated frameworks 1 and 2, while the documentation findings developed “evaluated framework 3”. By integrating the results from both the semi-structured interviews and documentation, the final CMKNM has been affirmed “Evaluated framework 4”.

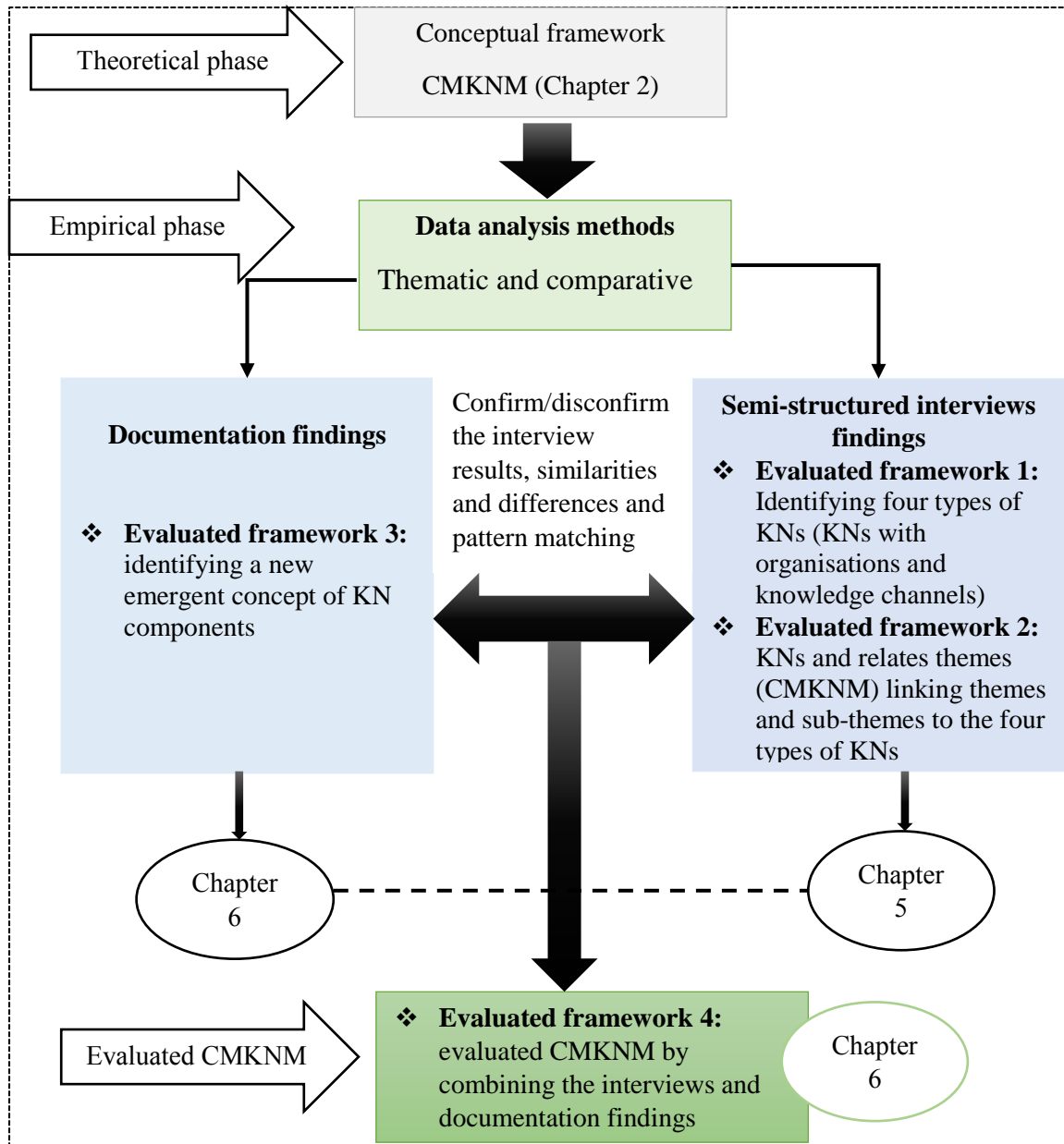


Figure 5.1: The process of CMKNM evaluation across the phases

There are four knowledge network types that mobilise knowledge in IT project change management; this was partially described in Chapter Two. However, empirical findings revealed that certain sets of factors need to be considered prior to constructing KNs. Although some KNs were not explicitly defined according to the results of this research, there is empirical evidence that those KNs which were identified are socially constructed across organisations (Alkhuraiji et al., 2014; Alkhuraiji et al., 2015). In the conceptual framework, factors affecting knowledge channels were not identified to describe the nature of KNs; there was also no understanding of how knowledge networks could be initiated and structured in IT projects across various organisations through different knowledge channels. Through newly emerged

Chapter Five: Data analysis (semi-structured interviews)

themes elicited from the analysis results, there is empirical evidence of KNs existence. The study's findings also suggested various sub-themes and knowledge elements for each knowledge network that was identified. Codes were extracted to generate sub-themes and finally to refine the main themes (see Appendix E, Table E1).

The empirical results are discussed under five main sections (Table 5.1) and include organisational factors, knowledge management infrastructure, environmental and critical factors regarding knowledge networks, factors influencing knowledge channels, and the initiation of knowledge networks in IT projects. The function of the sub-themes is explained to highlight how they offer greater understanding of the themes prior to further discussion for international companies, local private companies and government organisations in Sections 5.3, 5.4 and 5.5.

Chapter Five: Data analysis (semi-structured interviews)

Table 5.1: Explanation of sub-themes, together with their implications for the themes

Themes	Sub-themes	A brief explanation
Organisational factors	Organisational strategy	A clear understanding of strategic objectives and priorities; strategic plans defined.
	Organisational culture	Clearly understood organisational culture, including supportive culture, identifying cultural issues and their solutions.
	Organisational capacity	Organisational capital and social assets are assessed against needs and opportunities.
	Organisational structure	Organisational structure is planned, optimised and assessed against IT project's needs.
Knowledge network: environmental and critical factors	Routinising knowledge network activities	This is to have a clear goal and vision of key activities involved in a network (e.g. project management, incentive systems, knowledge network identification, top management commitment, controls & audit, managing external changes, development & implementation, and people management).
	Routinising organisational business activities	This is to have a clear goal and vision of business activities including external and internal (i.e. resourcing, people development, supplier communications, sourcing, bidding and contracts).
Knowledge management infrastructure	Resources	Allocating and identifying the resources needed to build up a knowledge management system.
	Tools	Providing the tools needed to establish knowledge management infrastructure. Developing, creating and supporting such initiatives.
	Systems	Enhancing the use of knowledge management systems, approaches, techniques and enabling technology.
	Authorities	Funding and proving knowledge management infrastructure policy and projects.
Knowledge networks initiation in IT projects	Innovation	Considering networks as a strategic direction towards innovation.
	Planning & evaluation	Knowledge network is implemented as a dynamic process.
	Implementing	Knowledge network strategy is employed within the strategic direction of an organisation.
	Extending	Knowledge networks are extended across the boundaries.
	Continuously managing and structuring	Employing a systematic approach to the structure and management of knowledge networks inside and outside the organisation.
Factors influencing knowledge channels	Knowledge network externalities	Internal networks consist of links of communication channels which coordinate their industry within the external market.
	Communication management	Employees' communications are to be encouraged through multiple approaches.
	Knowledge intermediaries	Knowledge brokering connects different parties to common knowledge/topics.
	Knowledge networks structure	The structural design of sets of knowledge network elements focuses on bringing principles of meaning and specification to each type of knowledge network.

During the analysis stage, once the themes and sub-themes, codes and nodes clustering and categorisation were explicit, the researcher involved three participants who agreed to take part in revising. This was to insure a greater understanding towards the meaning of each theme and sub-theme. The table above illustrates how the activities are defined by the organisations. For example, organisational factors (i.e. organisational strategy, culture, capacity and structure) are to be clearly understood, defined and managed to construct effective KNs. Since KNs comprises various activities, the researcher focuses on elements to bring principles of meaning and specification to each type of knowledge network to structuring KNs. The next section details the empirical results of KNs with organisations and knowledge channels.

5.2 KNs with organisations and knowledge channels

In order to build reliability in thematic analysis and coding, the researcher involved two independent reviewers throughout all the stages of data analysis (Alhojailan, 2012; Hosmer, 2008; Miles & Huberman, 1994). The independent reviewers have been engaged in IT projects across public and private organisations so have high level of experience.

The first consultant is an academic researcher specialising in knowledge management. He has led several IT projects in both government and private sectors in activities related to knowledge management. As well as publishing a book on the practices of knowledge management in real life, he has been a consultant and supervisor on many large-scale IT projects.

The second consultant is the vice-president of a public organisation. He has worked in IT projects as a project manager for several years and has led numerous IT projects at both local and international level. He was assigned as one of the IT project management regulators at national level. His speciality lies in project management and IT practices, but he also has considerable knowledge of business activities as he has been in top management for a number of years.

The results illustrate a structured knowledge network framework that includes the roles of the companies and the main knowledge channels within the knowledge networks (see the evaluated CMKNM 1 Figure 5.2).

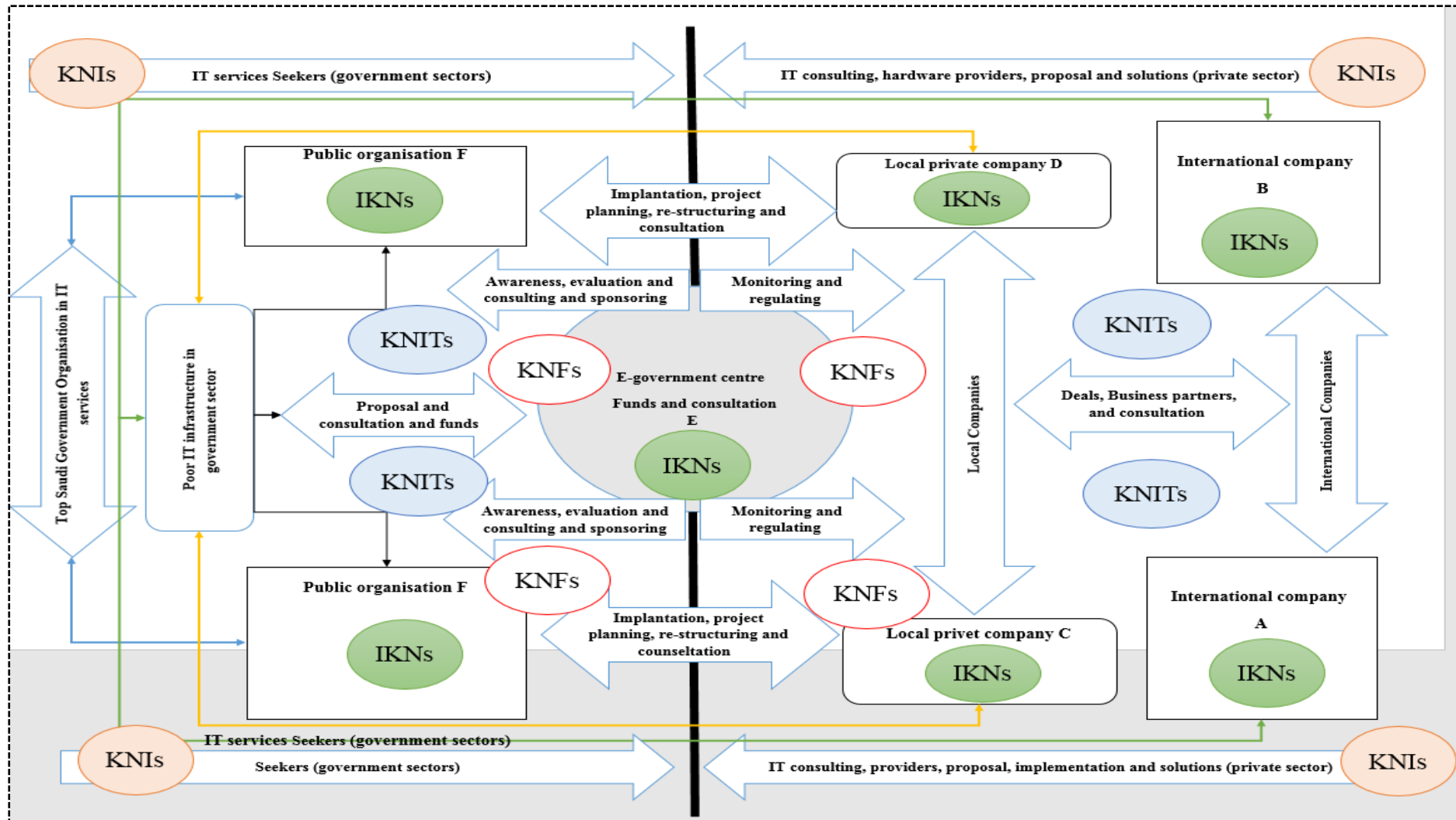


Figure 5.2 KNs framework with organisations and knowledge channels (evaluated CMKNM 1).

Chapter Five: Data analysis (semi-structured interviews)

The framework comprises two parts: the first explains how government organisations seek IT solutions and the second shows how international and local companies provide IT solutions to public or government organisations. The framework identifies the function of Public Organisation E in trying to play the role of knowledge broker on the one hand while raising the awareness of public organisations on the other. The interviewees explained some issues with regard to communication channels; these involved the alignment of IT projects with organisational strategies. Some public organisations seek IT solutions but they cannot identify their needs, their organisational strategies are not clear, and there is no clear vision or missions. This has been realised by most of the participants. For example, A business analyst revealed:

“When we propose overall organisational re-engineering they become unhappy, so we just propose an IT system that can do the work in the short term. We may know that the projects will not last for that long, but we have to do the job. Interestingly, we had organisations that seek IT solutions because they want to be like another organisation in terms of IT use. Of course, in the end it is a market so we have to sell our products. Our responsibility is to raise awareness, but sometimes we cannot make the decision for them.”

A structured knowledge network framework is seen as a key to understanding the dynamic process of how knowledge is transferred and mobilised across organisations to enhance the sharing, acquisition and documentation of knowledge in order to provide “lessons learnt”. Such a framework allows the identified themes to be linked to their related knowledge networks; these were advised in the initial process of constructing the CMKNM framework.

In order to align key knowledge networks and mobilise organisational factors, it is important to define the connections between the four types of knowledge network. These are the knowledge networks of interaction (KNIs), of interpretation and translation (KNITs), of influence (KNFs), and institutional knowledge networks (IKNs), (i.e. the knowledge base). Defining the connections between knowledge networks potentially provides knowledge traceability, thus creating decision gates to align key organisational factors in knowledge mobilisation. The Chief Executive raised the issue of consultancy services and how public organisation could learn from others. He commented:

“Public sectors usually buy their systems based on word of mouth or personal experience rather than from sets of plans. What we usually offer is products, change management

programmes, current state reviews, implementation and communication plan, IT functional assessments and requirements (including IT infrastructure) and etc.”

The participants explained the challenges facing IT projects in terms of cooperation among international IT solution providers, local IT project management, consultation companies and public organisations. The first challenge is related to the lack of strategic planning with regard to KM in corporate practice. The results showed an absence of KM in strategic planning in national bodies where KM is widely considered to be a single activity in management's prime duties and responsibilities. KM is also seen from a very narrow point of view when it is implemented only to solve internal issues such as conflicts, negotiations and IT project planning stages, instead of employing KM as a long-term strategic approach. The Director of Public Organisation E-services asserts:

“Most public organisations locally and globally do not have a department of change management which could deal with KM issues. There is rarely a programme of change management and it is not practised as properly as it should be. I believe any IT project should be treated as a change.”

The IT Project consultant added in this regard:

“I think there is an urgent need now to launch a project management centre to arrange various issues.”

Moreover, outsourcing companies apply KM for their own commercial advantage, rather than using their approaches to teach their customers and business partners. The Director of IT Services

“We always require vendors to provide training sessions within the contract to familiarise our employees with the new systems. This could be done through a small sample of people and then those who had the training session could teach the rest of the employees. This is to reduce the cost and time spent.”

Chapter Five: Data analysis (semi-structured interviews)

A further challenge regarding corporate practice is that the negotiation process is often not well implemented in most organisations, causing errors in IT project practices to be repeated. The Chief Executive believed:

“The negotiation process between public organisations and IT suppliers (local or international suppliers) does not follow a specific approach, methodology or procedure that can be used, customised, utilised, documented and then shared across organisations. It is rather self-regulated so it is miles away from being documented.”

A critical issue derived from the results in terms of corporate practice is that the absence of policies and regulations in IT projects at a national level was causing a proliferation of misconceptions among related parties regarding such practices. Total Quality Director said:

“There is little concern about policies and regulations whereas I see these at the forefront of any developments. There are policies and regulations but those are usually too broad or misconceptualised. Policies and regulations usually follow an internationally recognised framework, but are not customised to accompany the characteristics of local organisations.”

The participants showed concern about the lack of awareness of the role of an organisation's structure in supporting KM in strategic planning. In order to instil a corporate KM culture, the corporate structure must be carefully; the existence of interrelationships between organisational strategy, culture and structure must also be analysed. The Chief Executive explained that:

“Suppliers of IT services and products deal with organisations through IT departments who are in charge and become brokers. IT people then indirectly take the role of dealing with their own organisations as “suppliers and customers” rather than being an organisation's representatives who should identify the organisation's needs, work closely with other departments, and try to negotiate a good deal.”

Chapter Five: Data analysis (semi-structured interviews)

Another concern involves dealing with future technology and the economy where a failure to address uncertainties could put organisations at risk of losing valuable knowledge.

The Director of Communication office claimed:

“Knowledge management could provide the management with various scenarios to minimise uncertainty issues, since the economy and financial statutes are good, organisations should make knowledge management their prime concern.”

Most of participants believed that most government organisations, and private and public companies, suffer from a lack of expertise in areas of KM and PM, forcing them to outsource services. The Assistant of General Manager believed:

“I believe that training is a core process in development, but there are the associated issues of high cost, limiting the number of employees, employee turnover, holidays and absence. So senior managers are always blamed by top management and their departments’ employees for such mistakes and failures. However, training courses are usually run on a long-term basis and organisations are incapable of finding sound solutions.”

In the same vein, the Chief Executive claimed:

“Systems evaluation is usually outsourced since public organisations and local vendors are incapable of doing this on their own; there is a lack of experts in this area.”

The results suggested that a knowledge base, along with knowledge management strategies, tools and processes, and other elements of knowledge infrastructure, could help form strategic knowledge channels. Most public organisations rely on outsourcing companies for KM strategies to enhance their IT project management, with little reliance on a self-managed KM infrastructure. The head of KM office commented:

“International companies have found that project documentation helps them to understand business needs, thereby increasing innovation, communication and production.”

The participants viewed organisational maturity in IT project management as enhancing understanding of a wider approach towards developments in KM infrastructures while the Strategic Management Director stated:

Chapter Five: Data analysis (semi-structured interviews)

“Advanced public organisations in IT project management practices have recently developed a strategy to hire certified people in project management and business studies. Such an approach will not only help organisations to reduce the cost of system implementation, but it will develop an approach to raise and maintain awareness of such practices for organisational advantages.”

In terms of initiating knowledge networks in IT projects, the research results observed the need for key actors (both human and non-human) to build knowledge map; this pulls together all the parties to be involved in common interests. Knowledge channels are influenced by three main factors: knowledge network externalities, knowledge intermediaries, and the knowledge management infrastructure. Internal organisational factors affect those actors who coordinate the processes for pursuing development and innovation, or the processes involved in sharing an organisation's resources. Knowledge brokering is a key to connecting decision makers to the source of knowledge whilst the knowledge infrastructure contributes to shaping strategic knowledge channels. Fundamental and environmental factors contributing to knowledge networks, such as the commitment of senior management, the clarity of vision and goals, converting knowledge network activities into routine activities, and determining the nature of knowledge networks and incentive schemes, must be coordinated alongside the knowledge network strategy and core organisational factors. The Chief Executive noted:

“Training, though, is very important. Most employees are rarely trained or courses are not well addressed to the organisation's needs. We have to establish a long-term strategy for training programmes that include attending international conferences to be up to date with what is going on in the IT industry.”

The results of the interviews suggested top management involvement to be a key in initiating such knowledge networks, as well as in building the organisation's strategic direction and committing to its objectives. The Information Officer claimed:

“Most of the reasons why IT projects fail or are uncompleted are not well addressed and articulated, and most of the reasons are related to top management changing their minds or a lack of budget so the contract is broken.”

The findings also indicated that IT project knowledge networks must achieve clarity in terms of objectives and goals, whilst also involving network champions, network boundaries,

Chapter Five: Data analysis (semi-structured interviews)

network expansion, and periodic updating and development. The Head of Project Office pointed out:

“Institutional knowledge also needs mentoring courses and a knowledge map that connects new employees with experienced ones where they can still remain in contact, even after retirement. So, each company has its own approach to systematically collate the knowledge and experience of their staff to increase the organisation’s capacity in terms of learning and developing skills.”

The KM officer added:

“Most local public and private organisations do not have research or development programmes; they mostly rely on their experiences or government ministries’ instructions.”

The participants also highlighted issues such as language barriers which need to be considered in the construction of knowledge networks. In this regard, the Chief Executive said:

“Although international companies (suppliers and vendors) usually employ Arabic speakers to be their spokespersons, these people are not involved directly within project teams; rather, they offer consultation at a distance. So, the messages are usually misunderstood or misinterpreted causing poor quality decisions.”

Knowledge network activities are considered to be internal and external, with internal activities including network management and governance, stakeholder engagement, the identification of project owners, routines and norms, the organisation’s cultural and social attributes, communication activities, and collaboration; the latter, however, incorporates social activities, knowledge brokering and resources. The Chief Executive asserted:

“It is important to have the knowledge needed in project management, but what is more important is to know how to execute and perform the activities required. So, we try personally to construct a link between them but we do not do it systematically.”

Given that a large number of large-scale IT system projects are outsourced to external companies, resulting in the participation of various resources and actors in the numerous change stages and processes, the findings emphasised the crucial influence of knowledge

brokering. All of the IT consultants highlights the need of brokers to compensate the lack of expertise. An IT consultant claimed:

“As IT consultants, we need to start sometimes from scratch and involve all aspects of IT systems throughout all the stages of a project; this, of course, is more than what it should be. The reason is because there is always a lack of expertise.”

The head of project office explained:

“The role of information and knowledge brokering is so important; we are working in this area to enhance the success of IT projects in organisations. We play a fundamental role in connecting public sectors with vendors, giving advice, solving problems, giving technical consultations and conducting research to improve the service.”

5.3 Findings from interviews with international companies

5.3.1 Organisational factors

This section presents the empirical results based on three sub-themes under organisational factors: organisational strategy, organisational culture and organisational capacity.

5.3.1.1 Organisational strategy

The study predominantly refers this factor to the level of alignment between the chosen organisational strategies, change management strategies and knowledge management strategies during the initial decision-making stage as per the company's business objectives. Across all stages of an IT project, change management and knowledge management strategies are greatly impacted by typical users, IT professionals, executives, consultants, knowledge holders, vendors, stakeholders and other key actors. Therefore, it is important to take organisational structures, policies, political factors and other major business activities into account as key players are important in selecting a skilled team for an activity if change requirements are to be understood. This can be achieved through project managers who can select the right individuals to convey information and address any problems or concerns. A Total Quality Director claimed:

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“Meanwhile, organisations lack important skills to organise their documents using a systematic approach. Another issue concerns how can we make sure [that] such documents are accurate and appropriate. This task needs a highly qualified team.”

A high number of projects which fail to do so because of stakeholders’ lack of commitment and understanding regarding change strategies; this is often the result of knowing nothing about the change strategy or may be due to budgetary issues. Thus, many stakeholders, in this kind of situation, do not perceive an IT project to be a major form of change and do not treat it as such. Participant 4, an IT Manager, explained that:

“Numerous departments are impacted by large-scale IT project implementation, meaning that it is necessary to properly plan change and present the plan with consideration of the need, readiness and ability to change.”

In the same vein, Participant 3 also noted that:

“It is essential that the entire organisation is informed about the change in the same manner once the most relevant departments have been spoken to.”

Company A views a strategic plan in an IT project as a fundamental phase. It considers it as a set of activities which needs to be connected and well understood during the strategic analysis phase. This is also conducted throughout the overall strategic planning of the organisation. Internal key activities, including organisational, social, capital and organisational assets, are usually impacted by external change factors, such as the states of stakeholders, rules and regulations, and changes in the need for products and services. External changes occur with uncertainties, so the organisation needs to understand the external market to trigger awareness about other organisations offering similar services or products. SWOT analyses are conducted on a regular basis to highlight strengths, weaknesses, opportunities and threats. The company uses a systematic approach for risk management which includes collecting issues and connecting them to goals. However, the company highlighted the need for their customers to understand such practices to help them enhance the building of a solid IT project strategy. Participant 1 voiced the following concern:

“The main concern across public organisations is data integration and migration. Most public organisations are fairly new to IT systems’ advanced practices, and some of them use old IT

systems while others rely on paper documentation. So, it is a really heavy task for suppliers to track and identify such important documents.”

In this company, the risk management department works closely with the research and development department in order to help the organisation implement a project scenario programme. This programme helps the organisation’s employees to anticipate issues and work through them to provide various solutions. A classification system of issues is implemented which includes four main criteria: urgent, important, less important, future issues. Participant 1 claimed:

“A plan-capturing system allows us to assess all the IT demand from business units and internally these are prioritised and aligned to the available resources and budgets.”

Company A understands the importance of gaining a clear grasp of strategic objectives and priorities across all business units and utilises this approach with its customers. This approach is used to assess seven main criteria. These are: assessing the efficiency of the current strategies of support business units, identifying strategic and transactional services, understanding service commonality across business units, conducting a shared service strategy, assessing the key blocks to business efficiency, mitigating risk, and automating activities. Participant 4, an IT Manager, emphasised:

“There has been a recognised need for a more effective and formalised approach to organisational strategy and business planning. With a view to reviewing the direction of various key organisational units and some localised business plans for satisfying departmental objectives, ad-hoc exercises give some direction to IT plans. Importantly, a lack of consistency in the strategic planning approach means [that] IT directs the very best efforts towards planning, a response in line with a combination of business and IT goals.”

The results found that Company B, with regard to strategic planning, had a consistent documented approach which detailed the intended activities across all elements of the firm and also encompassed all key organisational units. The completion of reviews on a regular basis enabled IT to be more formally incorporated into the planning cycle. Moreover, key IT opportunities were also incorporated. In the light of this, competitor and trading partner approaches were considered where this was deemed necessary. Moreover, planning, as driven by organisational unit and department heads, required that IT and its main issues were

discussed and considered within each department. A Project Manager (specialising in national service projects) asserted:

“The project portfolio, along with its individual objectives and priorities, are communicated widely, with stakeholders afforded a consistent and up-to-date view of all component projects and their relative priorities. Bearing in mind portfolio success, accountability and responsibility are clear and shared between IT and business.”

In the same vein, a Project Manager, specialising in public organisation projects, pointed out:

“The project portfolio will need to undergo continuous review and monitoring so as to ensure alignment with priorities, must be established from the business’s strategic direction and bear in mind tactical goals.”

5.3.1.2 Organisational culture

Company A considers cultural factors play a fundamental role in IT project planning and pointed out several examples. For instance, the age of the organisation and the specific cultural typology have a significant impact on decision making regarding the selection of optimal change strategies. In the context of change processes, Company A finds a silo mentality leads to poor transparency in decision making; this is therefore perceived as a barrier. Transparency and trust must be nurtured through the creation of a community of practice that fosters collaboration between organisations in related businesses. Participants 1 & 3 noted:

“Public organisations have very complex business processes and culture so, unless we target those people who have the knowledge and hire them, we face difficulties in gaining such understanding”.

In order to build a central knowledge base for IT projects to enhance procedural knowledge for “lessons learnt”, cooperation among public sector organisations needs to be enhanced with high levels of trust and transparency by building a community of practice. Participant 1 said:

“Though some public organisations share common issues in terms of their structure, culture and needs, there is no single system that can make organisations aware of what is going on surrounding them. A national body should be created to minimise costs, increase awareness, save time and advocate cooperation.”

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Two of the interviewees, both Organisational and Structural Consultants, asserted that organisations often espouse a competitive culture and silo mentality, meaning that there is a call for greater insights into the nature of such culture with regards to power, maturity and diversity. The interviewees stated that it is not feasible to propose a change strategy until relevant cultural factors are addressed; this is their key focus since it is amongst the most challenging aspects involved in change projects. The interviewees also added that, in most cases, there is little support for problem solving, with opportunities for learning limited due to a lack of open conversation about things that have gone wrong. The interviewees stated that it is necessary to collaborate with customers in order to identify the right kind of support system, and that the change process must be upheld through the establishment of an appropriate corporate culture. For example, in order to find solutions to internal political issues and determine who the most influential actors and important knowledge holders are, it is vital that seminars, conferences and training classes are provided. Furthermore, because knowledge holders are so crucial to decision support, reward and incentive schemes must be used alongside other knowledge-sharing tools in order to address interoperability problems. Essentially, decision-making processes are shaped by the structure of the organisation, which is shaped by cultural typologies and this was believed by all participants. For example, participant 3 claimed:

“Top management usually are not happy to consider cost in relation to change management which includes some aspects of qualitative costs, such as organisational culture and “people mindsets” and aspects of organisational psychology. However, they are in favour of funding quantifiable aspects such as software, hardware and equipment.”

The company B has adopted a knowledge sharing environment through formal and informal activities, such as conferences, workshops, common coffee rooms, etc., to tackle cultural issues.

The company B results show that organisational culture is also one of the key factors to be considered in an IT project intervention. There was acknowledgement of a more project-focused culture, with various IT function-related elements structured in an effort to provide the business customer community with an excellent service. Most of the firm’s business is as a technology provider and there is some degree of coordination across production and development. However, there is a lack of end-to-end support or a post-implementation service for business customers. For this reason, the company implemented a strategy where employees

were provided with an attributable, formal, written scheme to encourage the raising of issues and the communication of suggestions to higher management. Team structures, in some cases, also facilitated internal communication while major areas of change within the business were ongoing and regularly monitored. IT and a Project Manager who specialised in national service projects said:

“I believe [that] the resistance of public organisations to change does not occur as conflicts that are expressed publicly, but this is a persistent fact which occurs behind the scenes. For example, resistance can be expressed as avoidance, ignorance, discouragement and revenge. Personally speaking, we need more work on organisational psychology to manage such “hidden conflict” and turn it into organisational benefits. This has to be considered prior to the execution of IT projects.”

5.3.1.3 Organisational capacity

Company A refers to organisational capacity an organisation’s financial, technical, functional, operational and organisational readiness for change, including the readiness of its employees, and its ability to fully understand, welcome and implement change across all of these levels. The company considers assessing the organisational capacity for any kind of project as an important phase of planning. The company consider IT projects as a change so they assess the needs of such change across ten elements: direction, mission/vision, business activities and strategies, organisational structure, leadership, organisational culture, strategy development, business planning, management systems, operations, business processes, information technology, people, and infrastructure. The second phase of assessing capacity is readiness for change. In this phase, five different criteria have to be addressed: the psychological ability of organisation to change, clarity of goals and vision, leadership styles and skills, organisation’s maturity in communication and knowledge sharing, and people skills in various areas, such as teamwork, motivation and so forth. Participant 3 stated that:

“If decision making is not delegated further down the hierarchy in planning stages, departments won’t work efficiently together, and organisational barriers interfere with the ability to satisfy the overall results.”

A Project Manager (Participant 2) claimed:

“People have faith in that substantial advantages can be secured if decision making is delegated further and interdepartmental relationships are developed.” He added:

“Unfortunately, management disregards the problems facing the organisation, don’t clarify what changes are being made and don’t highlight the interests of the whole organisation.”

However, Company B adopts a programme called “The regular (usually quarterly) cycle of interviews with development teams”. This was established with the aim of considering and quantifying the capacity/size implications of significant developments. Capacity planning software tools were also introduced in this regard. Commonly, capacity plans diverge significantly from the volumes/requirements recognised. Capacity could also be included in service-level reporting. Organisational capacity needs greater formality in terms of capacity planning and needs to be aligned with other organisational aspects. A Project Manager (specialising in healthcare projects) stressed the significance of the following:

“The dynamic load-balancing of development resources is ensured across all development groups. When considering minor and major enhancements, clear differentiation is ensured: the former are not referred upwards for review/approval but rather are managed within a fixed budget.”

A Project Manager specialising in public organisations suggested:

“Thinking of an effective strategy is not the key concern, but how to implement such strategy for organisational advantages. This needs you to be precise and objective with the resources and tools.”

5.3.2 Knowledge management infrastructure

The author has identified, through the data collected, that the knowledge infrastructure, including knowledge management strategies, process, tools (e.g. IT communication systems), and the knowledge base, can contribute to shaping strategic knowledge channels. A Project Manager from international company (A) who specialises in IT projects in the public sector, claimed that:

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“Having a solid knowledge infrastructure alongside a knowledge base allows for having standardisation in an IT project’s advertising, marketing, innovating, implementing and evaluation.”

The findings suggest that a knowledge management infrastructure combines resources, tools, systems and authorities to facilitate organisational activities. The knowledge infrastructure comprises socio-technical aspects of the organisation to identify issues of interaction between technology and people in addressing organisational needs. The key concern of project managers is the ability of organisations to address validation issues regarding an IT solution's ability to function towards specification in the operational environment through a set of decisions driven from a knowledge base. A Project Manager mentioned that:

There is a “need for greater formality in defining end to end validation of an IT solution's ability to function to specification in the operational environment through testing and proving, including test scripts and plan. Procedures may be written defining internal best practice but they are used inconsistently.”

Knowledge infrastructure strategies allow decision makers to visibly understand policies, process and work practices so they can base their assumptions and conventions on accurate data rather than subjective meaning. In this vein, the Head of a Project Office claimed:

“Some ad-hoc proving of a whole solution (infrastructure and application) may be done based on experience.”

Another participant claimed that the decision on an IT project:

“Has to be fully discussed with the business, must address their requirements for applications availability, and has to be mapped back to the underlying infrastructure to understand the dependencies on which it is based.”

Company A’s project managers interact actively with the process of revising the plan of the major changes needed, using software to effectively prepare, track, maintain and document everything. An IT consultant pointed out:

“The outcome is reviewed and the project structure and infrastructure are understood by the time tracking of activity; this is used to refine proposed models.”

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Conflict among stakeholders' decisions often occurs as a result of a lack of resources, or the unreliability of such resources, especially if such documents are poorly written. A Business Analysis Director said:

"I think even if we have some documentation, some of it is still poorly written, with no taxonomy; it is easily misunderstood and cannot be relied on. We need people who understand information to work with us."

However, Company B has utilised many techniques to advance its knowledge management infrastructure. The results show that the company assigns all of the main projects to be initiated to formally dedicated staff, who are provided with a clear and verified plan and estimate. They focus on guidelines and the estimate model with the availability of specific individuals. Different phases, stages and sub-projects are laid out in the plan so that deliverables can be provided in a time-efficient way. Importantly, the project structure and infrastructure have to be understood and documented into their institutional knowledge.

In this regard, the Project Manager specialising in national service projects claimed:

"You mentioned the term "institutional knowledge". As an international company, we always implement this concept alongside our risk management programme. We take key aspects into account, such as the challenge of today's aging workforce or the skills' shortage, so we have implemented knowledge hubs. This is a corporate intranet where all the skills and experience are codified; it is easy to access through a central digital repository."

5.3.3 Knowledge networks: environmental and critical factors

The results from the study indicate that the creation of a knowledge network, the level of commitment demonstrated towards its objectives, and the determination of its strategic orientation, depends upon the participation of senior management. An IT Project Manager believed that:

The "breadth and depth of experience should be sufficient to demonstrably fulfil the IT's mission, objectives and strategy."

All participants agreed that:

“The majority of IT people possess a mature business and technical understanding in critical areas of services and technology.”

However, two of the main aspects which arose out of the results were routinising knowledge network activities and routinising organisational business activities. These are compatible with advanced knowledge network practices. Routinising knowledge network activities comprises eight areas of consideration: project management, incentive systems, knowledge network identification, top management commitment, controls and audit, managing external changes, development and implementation, and people management. These areas need well-defined strategies to achieve network governance and stakeholder engagement, as well as to facilitate the identification of project owners, routines and norms, the organisation’s cultural and social attributes, communication activities, and collaboration. Such activities incorporate social activities, knowledge brokering and resources. In this regard, the Head of a Project Management Office stressed that:

“Strategies are to be identified to achieve organisation characteristics that enable effective knowledge management.”

The task of top management is to create a suitable culture for an effective knowledge management programme. One of the key issues facing most organisations is the lack of robust, systematic support to identify formally both codified and tacit knowledge sources within the organisation. In this regard, a Project Manager claimed:

“There is [a] gap in analysis between the existing system of identification of both codified and tacit knowledge sources within the organisation.”

Company A has adopted a knowledge map system that links staff. It is based on topics of common knowledge and is demonstrated as a key foundation for innovation, as well as helping to establish a knowledge sharing culture. With regard to this point, the Business Analysis Director commented that it is necessary to:

“Establish a culture of continuous service improvement, & information and knowledge access largely via trial and error.”

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The findings indicate that it is essential for key organisational factors to be taken into account, alongside the chosen knowledge network strategy, in order to support knowledge networks as part of a long-term strategy. All participants agreed with the point made by the Business Analysis Director who said that top management usually are not happy to consider cost in relation to change management which includes some aspects of qualitative costs.

Explicit knowledge networks should be supported through the use of an IT support system. Although there is some establishment of internal knowledge networks inside Company A, its main concern concerns building external knowledge networks with their customers. International companies claim that communication process between different parties is either too formal or through personal connections. This method is too vague and cannot serve as better practice. Public organisations alongside outsourcing companies are to work in a methodical way, such as building an “Industrial Co-operative Society like the usual practice in countries in wars.”

Despite the complexity of establishing an explicit knowledge network, the Head of the Project Office in Company A noted that:

“Some knowledge sharing occurs with trading partners.”

Another area of concern, seen by Company A as a companion method of routinising knowledge network activities, is routinising organisational business activities. The company has a clear goal and vision regarding its business activities at both external and internal levels (i.e. resourcing, people development, supplier communications, sourcing, bidding and contracts). The assessment of demand is carried out across departments to prioritise and address business activities to ensure that the allocation of resources is appropriate to demand. Both a Total Quality Manager and an IT consultant noted:

“I believe that there is an urgent need for public organisations to rethink their internal resources, and how to identify, address and utilise them. There is a mass of unconnected information, business activities, needs and goals. That’s why outsourcing companies charge them a lot, because they need to do everything; some things cannot be done simply by outsourcing.” (IT consultant)

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The Total Quality Manager pointed out:

“Limited Senior Management support may still result in quality being sacrificed to constraints.”

The findings from the company indicate that some knowledge sources are restricted to those within the organisation, though the culture encourages knowledge sharing rather than hoarding. The IT consultant believed:

“The culture within most projects is focused on products rather than benefits.”

The results show that networks have to be defined and cascaded within a proper structure; the roles of all parties engaged within a network must also be defined when considering routinising both knowledge networks and business activities. The findings also indicate that IT project knowledge networks must achieve clarity in terms of objectives and goals whilst also involving network champions, network boundaries, network expansion, and periodic updating and development.

Nevertheless, company B has utilised various techniques to routinise knowledge management activities in line with organisational activities within projects. For example, throughout the course of projects, various supplier contracts further incentivise supplier behaviour in the case of more critical projects. A systematic approach is applied to ensure critical projects are implemented with strong supplier management approaches; a growing emphasis is also placed on the ‘soft’ skills required in the efficient management of suppliers.

There has been an active shift towards a project-driven IT structure, and multi-disciplinary IT teams of analysts, designers and programmers who are assembled with regard to the needs for project resources, skills and experience. A Project Manager specialising in national service projects believed:

“There should be clear awareness of the purpose of IT by business and IT. Purpose is recognised in the context of maturity benchmarks and norms of the type of enterprise industry.”

5.3.4 Factors influencing knowledge channels

The participants had different views on the factors influencing knowledge channels, though the findings suggest four main areas of consideration where they were mostly in agreement. These were: knowledge network externalities, communication management, knowledge intermediaries and knowledge networks' architecture.

5.3.4.1 *Knowledge network externalities*

Internal factors: the results of the interviews show that a number of internal networks contain connections between communication channels that bring together IT project-related knowledge on innovation, development and production. The objective of such networks is to improve organisations' resource flow, whilst others aim to diffuse knowledge. Consequently, both informal and formal knowledge networks can exist. The former type represents networks that are impacted by culture, politics, shared values and common knowledge interests, whilst the latter type is associated with structural activities and organisational procedures, seminars, conferences and business reports. One of the interviewees, a Business Analysis Director, said:

"We hear about the term of knowledge networks, but what we have are not knowledge networks, they are business networks defined by job roles. Knowledge networks are not explicitly defined in order to be efficient. The main barrier is the misconception between knowledge networks and business networks."

External factors: Company A's results explained various communication channels which have been employed to improve its knowledge management practices in terms of subject matters. One of its communication channel strategies is to hire knowledgeable people (part-time), who have been working in public organisation, to become knowledge interpreters and business consultants. Another strategy is to work cooperatively with public and private organisations to understand the business requirements of their public organisation customers while a third strategy is to attend national conferences on IT project practices. Since Company A is an international company, language barriers are one of the most important constraints it faces in managing projects in public organisations. Its recruitment strategy is to select candidates who speak both Arabic and English fluently. The company has found this strategy to be effective in dealing with cultural issues within project management. Although the company is commercially focused, it has involved itself as a business partner with many organisations.

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This includes gathering together a community of practice and making its staff work in public organisations throughout all phases of an assigned project. Such strategies have helped the organisation to gain valuable knowledge that is stored in its knowledge base system; also, such knowledge becomes a product rather than a benefit. The IT consultant revealed:

“We look for skilled employees who have previously worked with our targeted customers; we hire them to increase our understanding of our customers’ business needs and issues. Public organisations have very complex business processes and culture so, unless we target those people who have the knowledge and hire them, we face difficulties in gaining such understanding.”

On the other hand, the results show that company B has built up its knowledge network externalities in several areas. For instance, it is the responsibility of the Research and Development (R&D) department to conduct periodic reviews of system-building tools and techniques, and to assess trends accordingly. Reviews assess a number of elements concerning the quality and productivity benefits against the product and its implementation, and organisational assets against opportunities. Such reviews extend to include critical analyses of organisational activities against external activities. High level languages, structured techniques, enterprise modelling and management control tools are used to enhance organisational knowledge. The Project Manager specialising in healthcare projects highlighted the following:

“Approaches are clearly focused on providing a response to service or project requests for information and proposals, with responsibilities and duties well laid out with regard to contract negotiation, bid preparation and presentation.”

The company has also implemented a programme called “Experience-oriented statements”. This programme focuses on maintenance in terms of providing project work with support and skills alignment; it is used with staff chosen, either to bid or work on projects and services and is intended to ensure a suitable utilisation of skills.

Another programme which has been implemented to evaluate demand focuses on delivering consensus across stakeholders, project managers, organisational strategic managers and IT people. Communication channels are reviewed regularly to achieve delegation in decision making to understand the progress being made and to amend work plans if necessary.

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In various areas of project management, communication is seen to be proactive, with some degree of awareness concerning more long-term communication management issues. Lines of communication with business units and relevant support functions are defined, with IT being consulted on key projects when this is deemed necessary. The Project Manager who specialised in public organisation projects believed:

“There is ongoing and active communication between IT and the business in the identification of management and compliance issues and associated opportunities.”

With regard to underlying requirements and how anticipated issues are resolved, the company has implemented a knowledge map programme that has been expanded to outside the firm. A consultancy programme has also been implemented in line with the knowledge map programme to offer good understanding of project management practices; it also assists in ensuring the effectiveness of internal policies and resources. Furthermore, value-added solutions are available to assist the organisation with various policy-related requirements.

A knowledge-sharing system is implemented for multiple IT projects. This system provides project budgets and undertakes responsibility for the approval, prioritisation and funding allocation in line with business investment opportunities, priorities and objectives; it also works to advise and consider input from IT. Project best practice is determined in line with the corporate strategic agenda. This could comprise the evaluation of improvements attained across customer and supplier boundaries, with a programme, or projects and priorities, established regarding the overall risk and strategic portfolio. A Project Manager, specialising in national service projects, noted:

“The knowledge management system plays a role in establishing company policies that are more wide-ranging for any arenas linked to IT which are dependent on systems and their changes, in terms of funding approval, data quality, change management and information management.”

5.3.4.2 Communication management

The researcher identified various techniques that have been used by Company A to tackle communication issues and advance communication management practices. As a service provider, IT is viewed as being a sound cost manager; communication exists among various

areas of external customer-related business with regard to facilitating business functionality by means of IT. Mechanisms which centre on interfacing with business planning processes have been established, for example, in terms of defining a process for plans, policies and procedures, with cost/benefit and risk analysis, suitable decision-making, demand prioritisation, guiding groups with clear responsibilities and roles, ensuring mutual communication with regard to decisions and needs, and quality-assured mechanisms. The IT consultant claimed that:

“Senior Management plays an active role in the evaluation of demand, as well as in achieving consensus relating to priorities. All significant investments are evaluated by both IT and business in an effort to ensure the achievement of robust cost/benefits. Moreover, formal communication channels are positioned in order to monitor progress and make changes to priorities when necessary.”

The results indicate that employee communications, attained through a formalised approach, are recognised as a need. Various managers implement an informal approach, such as in the form of a suggestion scheme, in an effort to drive forward employee communications. Employees are provided with an attributable, formal, written scheme to encourage the raising of issues and the communication of suggestions to higher management. Team structures, in some cases, also facilitate internal communication. Effective communications are encouraged with the application of a formalised appraisal system, with the inclusion of a review/feedback model. Team management acts as an indicator of management’s ability, with teams recognised as a sound mechanism for effective internal communication. The Project Manager believed:

“Employee communications are encouraged through a number of methods, such as team structures, a formal appraisal process, and informal social occasions attended by all staff.”

5.3.4.3 Knowledge intermediaries

The interviewees explained the role of knowledge brokering in connecting different parties for common knowledge topics, bringing up issues, providing best practice, and becoming key masters in connecting decision makers to sources of knowledge. However, the lack of knowledge interpretation, translation and documentation means that the value of knowledge brokering activities cannot be shown. A Project Manager believed:

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“Knowledge brokering activities have to be understood, interpreted, translated, evaluated and implemented within the strategy of an organisation.”

The findings reveal that various business areas could even be assigned their own roles for dealing with IT relationships, with the CIO maintaining ongoing communication with business units via knowledge brokering. The roles of knowledge intermediaries are as follows:

1. Regular involvement of IT people and the business's management facilitates communication and ensures insight into policy and legal limits in terms of accessing/disseminating and enforcing data. Moreover, knowledge brokers are able to help with enforcement and communication.
2. Knowledge intermediaries appear to be well informed with regard to the most pivotal areas and how IT solutions may be useful in aiding good communication and sound enforcement. When applied regularly by the business, knowledge brokering is valuable for enforcing and communicating policies. Moreover, it functions alongside the business to examine and overcome breaches.

Knowledge intermediaries are viewed as relevant and integral in the negotiation, interpretation communication and enforcement processes. A good understanding exists of legal and various other restrictions on enforcement, as well as the effects of breaches or inadequate communication. Moreover, an active role is adopted by the Knowledge Management Office in educating personnel and communicating policies; this is achieved through creative solutions. Knowledge management further assists in identifying solutions; it is well positioned to deal with compliance gaps and breaches. The company is concerned that their targeted customers generally require a more formalised method of managing vendors and service providers in line with the increase of supplier numbers. Moreover, records concerning agreements, contracts and licenses amongst vendors and providers of hardware and software services have to be maintained, with agreed points of contact being established with different providers. However, the Business Analysis Director believed that:

“So many information systems and work flow systems are used with no connection between them. What we are really facing is that there is no long-term strategy for alliances and expertise exchange programmes among public organisations”

The general views towards the above statement indicates that organisations are forced to outsource for companies to make policies, draw up their strategies and even identify their organisation's needs. This has caused confusion and misconceptions among public organisations, making them focus less on their infrastructure. This is extremely time consuming and very costly.

5.3.4.4 Knowledge networks' structure

Since the International companies rely on their internal knowledge to develop its products and services, many strategies have been implemented to connect external to internal knowledge in order to create competitive advantages. One of its strategies is the establishment of a knowledge mapping system. It is an explicit system which allows employees to be involved in live discussions so that relevant knowledge can be brought to the point of action at the right time. Although the company has made substantial attempts to increase its knowledge structure practices by defining its knowledge management approach and processes, and enhancing the use of technology, some misconceptions still exist with regard to understanding knowledge components. The structure of knowledge networks is seen as developing a technology to allow knowledge movement across the organisation. The IT consultant asserted:

“An ongoing process is carried out with a view to maintaining an optimal technology architecture, with a regular, formal, documented study by IT management/specialists to assess the long-term technical architecture.”

Although the technology is the core aspect of establishing the knowledge network architecture to support the development of databases, communications and networks, the design of a knowledge network architecture needs to align key organisational aspects with key knowledge components. The Total Quality Director believed that:

“Patterns and trends in technology undergo monitoring in comparison with a well understood framework for what might constitute business value: e.g. technology which might address a persistent problem, a key strategic direction for the business, optimise an existing business activity or allow the business to embrace a new business opportunity.”

Although knowledge network components somehow exist implicitly in the organisation's activities, processing knowledge network components is still a challenge. This was explained

by the Head of the Project Management Office as something that needs to be addressed further. It is noted that international companies are attempting to investigate all dimensions of adoption, including the skills to manage, ease of migration for legacy, impact on the business, impact on IT, dependencies on other parts of the technical architecture, and potential business value and cost. Active relationships are maintained with third parties for high quality leadership and partnering (via alliances or outsourcing); this is recognised as an option for extending core competencies.

5.3.5 Knowledge networks' initiation in IT projects

The results revealed that Company A has adopted various strategies to develop its knowledge networks by, for example, closing down projects that applies formal process to handover to business as usual operations. This allows for necessary capturing of corporate knowledge across all key projects. Another method is called 'transition procedure applications' which are agreed upon and applied in line with the project and the business functions of stakeholders and owners for the project, while adhering to all corporate guidelines across fundamental projects. Furthermore, there is a complete and conscious identification of "lessons learnt", in line with an agreed-upon framework, with such information being captured. Lessons are incorporated into the organisation's knowledge management procedures, and are used as reference material for future projects. In short, they are embedded into corporate understanding.

There is awareness concerning the need to ensure that knowledge management is actively promoted amongst senior management, with IT staff understanding areas of critical relevance, and their impact and nature. Strategies have been designed in such a way to satisfy the necessary cultural change via a formal project planning process. The success of cultural change is monitored and measured, with a formal knowledge map implemented with regard to knowledge sources; this is presented in a way that is deemed consistent with a knowledge management framework. Where necessary, the knowledge map, including relevant external sources, is expanded beyond the firm. Search engine technology is also implemented across the knowledge base, with the consistent acknowledgement of all knowledge contribution appraisers.

Ensuring the formal development and regular review of an enterprise strategy and plan ensures that IT has a formal input in terms of business planning. Plans across the organisation include the full impact of IT. These are developed with a significant degree of IT input: formally,

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through user groups, committees and board structures; and informally through excellent stakeholder management (there is ongoing meaningful dialogue between IT and business unit executives). The results shed light on five main areas of consideration: innovative networks, planning and evaluation, implementing, extending and continuously managing, and structuring (see Table 4.2). The IT consultant noted:

“The business acknowledges the need to complete IT service delivery reviews across its individual units, with IT requirements needing to be reviewed by the various departments, and subsequently individually procured or otherwise given to the IT Function on the corporate side. All of the business units are likely to establish and directly communicate their own requirements to IT.”

A Project Manager added:

“Before going on IT projects, we have to figure out who are the stakeholders, who are the knowledge holders, who are the project owners, who are the most effective people in decision making, what sources of knowledge we can access, who we need, who are our initial concerns, middle concern and final concern. Those details have to be available in order to draw our own knowledge map, then we process it. It has to go into many checkpoints before we make it explicit to our employees. If a knowledge map is explicitly available, there will be a higher chance to [successfully complete the] IT project within the cost and time agreed.”

Company A views these areas as fundamental in developing a knowledge network for IT projects. The reason for this is to define risks and issues so they can be communicated and outlined. Risk assessment directs attention to a number of different areas, including project complexity, project size, management, the technical skills required, and impact on the enterprise. The publication of contingency plans is carried out on a per-project basis. Problem control procedures throughout the course of development are combined with issues and risk management.

However, company B perceives the role of IT business as significant in establishing a suitably well-communicated structure, as well as its overall alignment to the organisation and the degree to which it enables strategy, further facilitating effective direction. Regular reviews are carried out using various methods, such as brainstorming techniques, in order to improve and enhance understanding, and to ensure consistency and the coverage of responsibilities and roles in

commencing such a project. The company is trying to shift its IT projects to a business systems-orientated structure, with IT groups aligning their efforts with the support and development of applications for specific areas, generally with the central internal programming group. The company believes this approach identifies managers and groups who can address emerging IT support and project issues: e.g., quality, decision making, change management, etc.). This is believed also to ensure that roles have backup which enables the company to eradicate dependence on the efforts of individuals. In this regard, a Project Manager specialising in healthcare projects emphasised:

“If there is a lack of understanding of the accountabilities and responsibilities, that complicates decision-making and development.”

In this vein, another participant claimed:

“Thorough organisational review exercises are carried out by IT management on a periodic basis in an effort to deal with the perceived management and organisational issues. Reorganisations generally are centred towards enhancing control and support specialisation; however, there is the potential to induce dispersed accountability for the decision-making issues across all parties involved in an IT project. Various areas are arranged in relation to services as opposed to products; however, this is not consistent. There should be a clear link between IT organisation and sourcing decisions.”

5.4 Private local companies

5.4.1 Organisational factors

In this section, the empirical results are outlined based on the three sub-themes explored in this study in private local companies: organisational strategy, organisational culture and organisational capacity.

5.4.1.1 Organisational strategy

The participants revealed that the attitude of private local companies towards the role of organisational strategy for IT projects is fundamental. The company C mainly puts this factor down to the level of alignment between the chosen organisational strategies and IT project planning. The organisation responds to day-to-day pressures, with the plans which are in place covering just a small portion of the business. IT alignment with the business plan is therefore

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informal and centres on the business knowledge possessed by IT management. There is a tendency for the IT plan to be very much focused on IT goals rather than organisational goals. A Project Manager stressed:

“As a project manager, I think I can sometimes predict whether or not a project will be beneficial to organisation X, but it is not my business to decide that. It is strategic management’s responsibility to plan, evaluate and align the project to their organisation’s needs. I believe in the concept of being “task-focused”.”

In response to gaining an understanding of organisational strategy, the Chief Executive of Company C confirmed:

“Top management and decision makers are responsible for searching for industrial collaborations; this has to be implemented within the organisation’s strategy and includes building vertical and horizontal networks to facilitate information exchange.”

However, the company C faces various issues in planning projects for its customers. It was noted that some public organisations failed to address a business plan or strategy so addressing organisational needs was a difficult task. The company believed that a well addressed organisational strategy is the key element of IT project success.

On the other hand, the results of company D revealed that the company is in favour of making its organisational strategy parallel to its ongoing IT project strategies; it also considers that organisational strategy must be at the forefront if multiple IT projects are to be led successfully. The company considers itself to be a project-oriented organisation and so it has been implemented a holistic and integrative approach to addressing project management requirements and organisational needs. The company has adopted customised PMI and PMO frameworks in alignment with its organisational strategy in order to deliver project-related services to increase its organisational capability in terms of project management, project culture, portfolio management, governance, operational project support and human resources. The Strategic Management Director asserted that shifting from a traditional way of managing multiple IT projects is no longer practical as the complexity of modern business activities needs precise frameworks:

“Planning for an IT project isn’t an easy task. We usually look for expertise to broaden our perspectives: both individuals and institutions.”

5.4.1.2 Organisational culture

The company C results show that organisational culture is one of the most complicated elements of IT projects. The company regards cultural aspects as being well understood; these are addressed before the planning and initiation of a project. The company C adopts a programme to understand decision issues in IT projects as the company has a great deal of experience in implementing IT projects across public originations (their business partners). The programme targets senior managers in public organisations who attend and discuss common issues; it also is used to raise awareness among public organisations to the advantage of all parties (networking and cooperation practices). The Head of the Project Office suggested:

“Joint facilities among companies and public organisations are the base for cooperation; this needs a national project to increase social capital and to increase the opportunities for joint innovation and community learning practices.”

Nevertheless, the results of company D show that the company has established a sound knowledge management culture by introducing a knowledge management office. In terms of organisational culture, the role of the knowledge management office is to solve organisational cultural issues across the organisation, project management teams, customers, vendors and suppliers. For example, the company has implemented incentive systems to increase knowledge sharing where one of the ideas to increase such activities involves the company rewarding its employees for attending international conferences in various fields that result in organisational benefits. This automated system allows employees to post business issues and solutions; the more views and likes, the higher the rewards employees obtain. The company fully funds conference fees, flights, etc. and employees are required to make Power Point presentations of what they have learnt on their return. Regarding this, the Knowledge Management Officer commented:

“Such rewarding system initiatives are essential in influencing a knowledge-sharing culture.”

5.4.1.3 Organisational capacity

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The results show that the local private companies see the assessment of organisational capacity as a significant part of the planning and initiation processes of an IT project. They adopt the internationally recognised body of work introduced by “McKinsey” to assess organisational capacity and assesses six main areas when considering capacity: organisational capability, resources and structure, human resources, financial assets, social capital assets, external relations. However, there is an acknowledgement of the need for greater formality in capacity planning although significant system plans are considered in estimating capacity requirements. Regular (usually annual) reviews are completed. These are carried out as a background task by technical specialists, with the limited involvement of developers. Generally, success in this regard rests on the reviewer’s own skills.

In terms of capacity building and development, the results showed that the companies set out to increase its institutional knowledge by collecting various principles, ideas and practices related to IT projects in its knowledge base. The organisation’s structure is planned, optimised and assessed against the needs of the IT project and the company gains advantages across boundaries by outsourcing solution services to partners. The results revealed that the companies conduct projects using a best practice approach by connecting public organisations and agencies to specialist international and local partners in various fields. A Strategic Management Director claimed:

“The most important and challenging issues in an IT project is capacity assessment and development; they require skills and organisational knowledge.”

He added:

“Capacity assessment provides entities to make a well informed decision-making process and develop planning capabilities, strategy improvement, and resource allocation.”

The results show an important aspect of organisational capacity assessment roles in enhancing resource allocations whereby decisions can be aligned with the overall strategic direction.

5.4.2 Knowledge management infrastructure

Via the data collected, this study identified that private local companies utilise knowledge infrastructure in two main areas: knowledge sharing and knowledge storing (project portfolio). The Head of the Project Office in Company C thought that:

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“Documentation and knowledge transfer are the main concerns of knowledge management principles and a project portfolio is the key to maintaining long-term success for a project management strategy.”

In light of the project management portfolio, a consistent approach to the management of the programme has been achieved. The results explain that related projects are included in a programme that is managed with sound governance structures, plans, control processes and definitions; these are aligned with those of its projects. A Programme Board is in place in which accountabilities are clear, with the organisation owning the programme; the IT function is represented in the form of a supplier role.

Through the collected data, the author found that the companies build their knowledge infrastructure using various practices. A knowledge application system is in place and has been utilised to solve many organisational and management issues. Knowledge-sharing techniques have been implemented. These include the living document platform system, a rewards system, training, and social programmes and activities. Knowledge acquisition is employed to help employees absorb knowledge through attending international conferences and exhibitions, and by outsourcing IT projects. The Knowledge Management Office, whose officer is a member of a top management committee, deals with knowledge interpretation and translation, providing the company with meaning and understanding. This office assigns knowledge officers to each unit and department to work collaboratively across the organisation. The Head of the Project Office commented:

“The success of all projects depends on human elements to incorporate with enabling technology.”

A Project Manager specialising in public organisations confirmed:

“As IT suppliers, one of the issues we face when trying to implement a new system is integration between the old system and the new one. This is due to the lack of documentation from previous suppliers, the high cost of system integration, and organisations that are not capable of using a dialogue-type approach to solve problems. These cause organisations to experience a level of hesitancy to take such a risk, so either they introduce such a system separately or discard the project as a whole.”

5.4.3 Knowledge networks: environmental and critical factors

The results shed light on how the company C is routinising knowledge network activities and organisational business activities. For example, a service catalogue exists which facilitates insights into what can be purchased in terms of IT and related products and services. All marketing activities are detailed in a marketing database; these include: resourcing, people development, supplier communications, sourcing, and bidding and contracts. Knowledge activities concern project management, incentive systems, top management commitment, controls and audit, IT project implementation, and people management. The results identified a number of issues with the business, and so expanded on the reasons underpinning the adoption of company-wide policies in the fields of knowledge management practices. Several examples concerning best practice policies were presented by the IT department, with the business acknowledging the need to devise such policies in these areas. Although some policies have been devised in this area, the priority given to this is low, and there is a tendency to delay these activities in line with high-priority projects. Nevertheless, business related areas, such as processes, activities and projects, are lacking inherent key elements of knowledge management. Although various projects receive contributions from internal and external specialists, this is not applied in a systematic manner and such knowledge network activities are not well communicated. For example, data requirements management is covered as part of an existing project: i.e., implementation of a new system, migration to a new business system, and significant data cleansing exercises. However, there is no distinct work stream or the application of a formalised approach. The Head of IT Services believed:

“There is no single method to help us construct a systematic network since we lack expertise and face complex issues. There is poor collaboration due to a lack of understanding and conflicts of interest and fear of failure exists across the industry.”

In this vein, the Chief Executive of Company C said:

“We have not utilised a specific method of negotiation. It is done by experience and cannot be passed from one person to another. Usually, there are specific people who deal with customers and vendors, project management teams, and who link internal and external networks. It is more personal coordination at the beginning but it then turns and is dealt with at an organisational level once it comes to the contract, agreements and so forth.”

However, in company D the results showed that the Knowledge Management Office has built a significant framework to routinise knowledge network activities. The framework has key knowledge management components: i.e., knowledge identification, knowledge sources, knowledge connectivity, knowledge traceability and knowledge transfer. Since the organisation considers itself to be a project-oriented company, the Project Management Office utilises knowledge strategy to advance project practices in different areas. The Knowledge Management Office tracks the alignment between the project management strategy and the organisation's strategic direction. The Knowledge Analysis Group, formed from different departments, is concerned with routinising organisational business activities. Organisational activities and knowledge activities are analysed collectively. A new or updated framework is generated to address knowledge requirements. Furthermore, the company has established a strategic partnership with the Public Education Evaluation Commission to strengthen its understanding of project management and knowledge practices. The Knowledge Management Officer believed:

“We have not established R&D yet, so we cooperate with universities and researchers to identify practical cases that need further investigation; we benefit from them and they benefit from us.”

5.4.4 Factors influencing knowledge channels

The results revealed that the company manages its external knowledge networks through the experience of the customer relation team; there is no explicit framework that is used. Standard terms of communication management are lacking, with service measurement seen to be reactive. The experience at organisational and individual levels is commercially focused, which is seen to offer a comprehensive understanding of knowledge management practices. Various aspects of project management ownership lack clarity, meaning disagreements could arise in terms of who is responsible for resolving issues. Some measurements have been adopted but these are not always applicable at organisational level. Moreover, although reports are available, these are not addressed systematically at the level of institutional knowledge.

However, the company plays a fundamental role in knowledge-brokering activities and offers great individual experience although this is implicit. The company has developed business partnerships with advanced local and international organisations in IT project management practices. The CIO of the company C acts as a true business partner in multiple projects across

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different parties, ensuring knowledge and an awareness of business needs are available; this further drives business change through the application and sound direction of technology. Business and IT strategy are integrated in their entirety and are mutually dependent. In this regard, the Chief Executive of Company C said:

“There has been clear definition of IT projects’ success measures, with knowledge-sharing arising with trading partners.”

Company C has encouraged a more formalised approach across the firm in terms of considering projects as part of a more wide-ranging portfolio. With regard to managing the project portfolio, business and IT areas share responsibility. Dependencies between projects are also taken into account, with portfolio reviews carried out at key milestones and events. All projects within the portfolio are required to highlight tactical or strategic business benefits. However, the results show that the company lacks an understanding of more advanced knowledge management practices to implement such an approach in its project management programme. The results revealed that a knowledge management approach would help the organisation to consider a project portfolio as an element of knowledge management that requires continuous review and monitoring to ensure it aligns with priorities which are established from the business’s strategic direction which bear in mind the business’s tactical goals. A Project Manager noted:

“From my experience in project management, I think any IT project intervention is everyone’s concern across an organisation. So, the vision and mission should be shared across the organisation and should involve and acknowledge human thinking. You will need to make everyone important to motivate people.”

Nevertheless, in terms of knowledge network externalities, the company D has built up a strategic approach to network its knowledge practices. The results showed that the company is a strategic partner with several industries, including education, IT international suppliers, IT local suppliers, government agencies and international exhibitions. The company has signed an agreement to exchange its knowledge and practices with different parties. However, although the company has made advances in its knowledge network activities, it lacks a systematic framework for managing these networks for several reasons. The first reason is that most of the company is currently focussing on making its knowledge management infrastructure more robust, while the second reason relates to external issues across the

government agencies by which the company is employed to work on their IT projects. A Project Manager specialising in public organisations claimed:

“I believe that all organisations should manage their IT projects based on best practice cases, but best practice cases are sometimes not available or not documented, so usually decision makers use their own business networks and “not knowledge networks” to search for good options or the right information, thus overlooking their organisation’s characteristics and culture.”

He added:

“Personally speaking, if a project manager is involved in other aspects (political, organisational, cultural and so on), it will cause many conflicts and, from my experience, projects are highly likely to fail.”

The results from Company D explained various communication channels which have been employed to increase its knowledge management practices into sensible ground. One of the communication channel strategies is knowledge exchange with strategic partners while a second is the implementation of a Knowledge Management Office to align knowledge network activities with business activities. A third strategy is the establishment of a consultancy group scheme for customers. Furthermore, a solution-based scheme has been implemented to identify potential failures or risks that need further research and investigation; the company then works with specialised researchers to obtain further understanding. More strategies concern the identification of particular international experts in the area when the company is unable to provide more support. Although the company is commercially focused, it has involved itself as a business partner with non-profit organisations to expand its social capital and understanding.

In terms of communication management, the results revealed the use of multiple vertical and horizontal approaches. Internal communication of knowledge is encouraged through a living document platform system, while ideas, issues and solutions are documented in a knowledge base system and interpreted in a simple way to decision makers. The internal communication of knowledge is supported by committees and workshops, social events and programmes, seminars and common rooms. External communication is supported by a customer relations department that is directly linked to a knowledge base to provide solutions and support to its

customers. The Project Management Office works closely with the Knowledge Management Office to support stakeholders, ensure project ownership and identify key players in political, cultural and organisational terms.

The s results illustrated the fundamental roles played by knowledge intermediaries as the company considers itself to be “implicitly” knowledge brokering. The establishment of a consultancy group scheme allows the organisation to set itself up as a source of knowledge in various areas related to IT and project management. It further involves itself in new areas where there is a potential to gain new knowledge and convert it into a commodity. For example, the company advertises its local products and innovations at international exhibitions to boost its reputation. The results also shed light on its knowledge brokering activities which concern the heterogeneous, perishable, intangible aspects of knowledge. Such a knowledge brokering culture is attributed to the company’s overall culture at both organisational and individual level. The Knowledge Management Officer believed:

“Our consultancy team takes part in numerous IT projects and related developments; they link individuals with decision makers, link issues and solutions, and bring more understanding.”

Although the enabling technology is the core aspect of creating a knowledge network architecture, the company has utilised its organisational knowledge to build a knowledge sharing and business solution system. The living document platform system is generated to increase knowledge sharing, to update knowledge, and recreate such knowledge. It is used internally and is accessible to all employees.

5.4.5 Knowledge network initiation in IT projects

For company C, projects undergo a basic assessment at the initiation stage, with the application of business cases. A number of the projects have been reviewed jointly between business and IT, with some degree of formal project ownership and sponsorship, but notably lacking any significant re-evaluation in terms of adding value. Importantly, any degree of ongoing prioritisation is mostly subjective and commercially focused. Most of the projects have been reviewed following the initiation stage, with such reviews carried out largely at the IT level, and only at a business level to a certain extent. Project initiation, planning, evaluation, implementing and post-implementation are reviewed mainly on individual experience, and on

best practices available in the company's project portfolio systems. With regard to IT project initiation, a Project Manager said:

“Generally speaking, staff implement different methods of working, determined in line with their own experience. Generally, these go without formal agreement before beginning work; this saves effort and time.”

There is no formal approaches to knowledge network initiation in IT projects, with the technologies being chosen on the basis of the experience of individual systems, managers and leaders, or otherwise by considering the behaviour of peer organisations. Although effort has been made to increase its organisational understanding in terms of IT project practices by being a close business partner to some international companies, the company uses its good reputation and individual experience to maintain its relationships. The results show that the company lacks understanding of some fundamental aspects of knowledge management.

On the other side, the results of company D indicate that all projects undergo regular progress reviews in line with the business case and core benefits while there is a formalised and structured approach to establishing a project's priority. Projects are found either to fit with the overall portfolio objectives or are examined for business case re-evaluation. Projects are successful if they deliver the targeted business benefits. The way in which IT work packages relate to the overall business change project is well understood by IT which works proactively to ensure that the right approaches are used while these key documents are used to resolve problems productively. The approach is updated on a continual basis to ensure currency with best practices and experience. The Knowledge Management Officer asserted:

“Project assessment based knowledge is very essential to eliminate projects' subjective prioritisations which are caused by a lack of recognition of the overlap between business and IT projects, with no post-initiation assessment of value recognised.”

5.5 Government organisations

5.5.1 Organisational factors

In this section, the empirical results are outlined based on the three sub-themes explored in this study for government organisations: organisational strategy, organisational culture and organisational capacity.

5.5.1.1 Organisational strategy

The overall results indicate that there is a recognised need for a more effective and formalised approach to organisational strategy and business planning in supporting external projects in government organisations. In terms of reviewing the direction of various key organisational units and some localised business plans for satisfying departmental objectives, ad-hoc exercises give some direction to IT plans. Importantly, however, a lack of consistency in the strategic planning approach means that IT directs its very best efforts towards planning a response in line with a combination of business and IT goals. It is common for business plans to detail high-level goals; these may be difficult to link to IT services or projects. Moreover, there is little awareness of IT opportunities in the business plans. The Director of a Public Organisation's e-Services stressed:

“We lack system evaluations from non-profit organisations that would help to encourage both public organisations and suppliers to increase transparency and quality. This is because there are always disputes among suppliers and public organisations that should be handled and managed in a systematic and transparent way.”

However, the results also showed that Organisation E has made an effort internally to ensure that its enterprise strategy and plans are formally inputted, developed and regularly reviewed in terms of business planning. As agreed by most of the participants, The Head of the Knowledge Management Office believed that there is a lack of awareness in public organisations about how their needs are addressed, their resources are allocated, and how sound goals and objectives are set up. Organisational strategies should be derived from organisational needs and desires, not from shifting technological needs and desires. He commented:

“I think if the IT alignment with the business plan is not strategic but “informal” and not centred on the business knowledge possessed by IT management, there will be a tendency for the IT plan to be very much focused on IT goals rather than organisational goals.”

The results from organisation F showed the essential role played by organisational strategy in aligning its IT projects to business needs. All of the results indicated that the IT projects are booming and that large-scale infrastructure is being upgraded to improve organisations' project-based IT services in areas such as networks, systems' integration and work performance. The organisation believes that competitive advantage can be gained by successful

project management which must be derived and defined by the overall strategic objectives of the organisation. Non-core IT activities are a key concern since there is demand for the highest level of operational efficiency which can result from the convergence of technology and various business functions. IT operations require a practical *modus operandi* to manage interconnected services and that is why public, and even private organisations seek third-parties to provide more value in terms of IT functions and understanding. The company employs PMI and PMO, outlines in alignment with its organisational strategy, and manages project-related services to increase and enhance its organisational capability, project culture, portfolio management, governance, and operational project support. The organisation has implemented planning and projects within its structure which comprises the following four interconnected units or offices: total quality management, PMO, business process management, and strategy management. These offices are connected to the planning and project manager who is, in turn, linked directly to the board directors and executive committee. Such roles are seen as essential in getting decision makers involved in PM related issues in practical terms. The Head of the Business Strategy and Development Office explained how the company learnt lessons from other organisations which changed direction. He mentioned:

“There is always conflict among business people and IT people in trying to have the power to make such decisions. Meanwhile, they blame each other for faults if such systems fail to meet the needs of an organisation. That is why we wanted a balanced and satisfactory solution that makes those parties function as alliances for overall organisational advantages rather than being rivals.”

The findings from organisation G suggested that the alignment between organisational strategy and IT projects is a core element in achieving the overall goal of the organisation. The results also shed light on several practices regarding the organisational strategy of organisation G. The organisation has its own projects and also monitors and regulates other related projects in public organisations and services. The organisation has set up a plan and vision that is broken down into sets of plans for relevant public agencies to follow. The main reason behind this approach is to ensure that public agencies track their large-scale IT projects against their overall strategy to achieve a soft e-transformation of public services. This has been met with various challenges, as well as those concerned with the lack of business partnerships and collaboration among related agencies. This comes as a result of interrelated issues, such as the lack of IT maturity practices, overlap among roles, poorly defined organisational structures, missing

fundamental knowledge, the lack of a well-defined programme of change management, and complexities in the organisation's business activities and culture. All participants believed that most public organisations select IT systems based on IT departments' experience or the success story of an IT system implemented somewhere else. One participant, a consultant to the organisation who was a Project Manager specialising in program management and analysis of projects, claimed:

"We use two kinds of method: relying on IT people's experience or outsourcing to experts in the area."

Another participant, a Project Manager, relates organisational strategy issues to a lack of objectivity in decision-making support mechanisms. He stated:

"Most public organisations cannot rely on their internal information sources since most of them come from "mouth to mouth" so subjectivity is the key concern of decision makers."

A greater concern is the need to build a sound strategy. Most organisational strategies are built by yielding to external pressure to catch up with other similar government agencies. A Project Manager specialising in IT projects between public and private organisations asserted:

"It is not about what methods and models you can find in the market, but it is about how you can select such to fit your needs. Customisation is something you cannot avoid and we do not have a level of objectivity when it comes to customisation. I think we need to think about such an approach to minimise uncertainty."

The results indicated that, although government agencies share some common issues and culture, the way their businesses operate and how decision making is conducted is, to some extent, different. For example, the participants suggested that it is essential for government agencies to have a well-planned organisational strategy, driven by their organisational characteristics; this needs thereafter to be aligned with the overall governmental plan for e-government or GBS (Government Bus Service).

5.5.1.2 Organisational culture

The results revealed that organisational culture is not well understood and thus cultural issues remain hidden in government organisations. Most of the participants agreed that cultural

aspects of IT projects derived from IT-related perspectives and not from knowledge from the divisions and departments of the entire organisation. Participants' views were very similar regarding the role of organisational culture in influencing the success of IT projects. However, the most challenging issues relate to the transformation among public organisations towards good practices in knowledge management and the culture of project management. Although some of the decision makers might be aware of the technological benefits of new systems, cultural aspects were not structured in an effort to provide the business with clear direction. Most of the public agencies' IT projects derived from IT departments where many did not have project management and knowledge management offices. Although good coordination among them sometimes existed, such coordination remained neither strategic nor systematic. The Head of the Project Office said:

“Since we have been responsible for the e-government programme, we have made a very good team with combined skills in various fields, such as project management, business processes, business analysis, organisational culture specialists, organisation re-engineering, IT consultancy, business relations and stakeholder relations. This team works collaboratively with government organisations to help them with IT projects from the planning stages to project delivery.”

Moreover, most public organisations outsource their IT systems, IT project management, IT implementations and project evaluation; there is no single common approach to help them learn from each other. The IT Project Consultant claimed:

“Most organisations and even departments search for good options or the right information by their subjective effort and analysis, thus overlooking their organisation's characteristics and culture.”

The findings from organisation F revealed that cultural development is the top priority in the strategic direction of the organisation. All participants stress that the organisational culture determines IT projects and project management; it also drives organisational strategy to achieve its objectives. The organisation is believed to have a solid understanding of its role and suitable initiatives were employed to conduct an analytical and comprehensive approach in order to understand all of its related aspects. A practical solution was implemented within the structure of the organisation, creating a Department of Corporate Communication. The Department is central to the overall structure and links directly with the Board of Directors and

the Executive Committee. The Department's role is not only to administer the routine communication channels within the organisation, but also to suggest and implement various knowledge management methods to support the organisational culture. The Director of the Communication Office explained:

“Power control issues emerge as a result of the absence of roles for IT people to delicately help business people to understand the value of the introduced system rather than taking it as a task has to be accomplished. IT and business people have to work as allies, rather than as competitors. Top management's role is to bring them together and make them work as a team.”

Organisational reports are encouraged by the top management to highlight work community issues that are to be further discussed and investigated. This is to provide solutions and eventually increase work productivity and performance; employees' satisfaction generates new valued-added services.

In line with the above, the findings from organisation G also indicated that aspects of organisational cultural are largely taken into account. IT projects' success is determined by the ability of organisations to plan cultural aspects with a proper change management programme in place. One of the most common cultural aspects across government agencies is undefined resistance to change. The results highlighted that resistance to change can emerge in various forms, some of which are hidden and unrealised.

However, the results found no evidence of a programme covering cultural aspects that had been explicitly set up to solve fundamental issues, such as political concerns, resistance to change and conflicts. The results also shed light on why there are gaps in terms of involvement in decision making among top management, project teams and the organisation's employees. One of the key reasons for this relates to the organisation's structure that consists of numerous layers but among which communication channels are inefficient. Such issues were found related to decision-making authorities, decisions were centrally maintained; this discouraged the involvement of senior management and front-line staff. There was a lack of understanding of organisational strategy and objectives across the organisational levels. In addition, there was no systematic approach to control issues and problems, which were generally solved as they occurred. Even if a KM system existed, it was not implemented within the organisation's structure and strategy to support cultural aspects. The concerns of top management centred only on the delivery time of projects, their cost and, to some extent, their quality. Top

management did not appear to support a change management programme which was seen as an extra complimentary package. A consultant to the organisation claimed:

“One of the biggest issues facing IT projects is multiple ownership of projects and that can create conflicts if not well planned.”

Another participant commented:

“Most stakeholders and decision makers do not consider change management yet this should be treated as a core programme in an IT project. This is because currently change management mostly deals with organisational and social issues; here lies a misconception.”

5.5.1.3 Organisational capacity

The results from organisation E demonstrated that the main strategy of the organisation is to implement and govern communication and IT systems across public organisations to bring competitive advantages to services and the economy. The organisation has therefore established a system to manage its internal knowledge assets and resources strategically to provide a good example for other related organisations. The organisation has created several offices within its organisational structure to deal with projects and knowledge-related aspects. The Knowledge Management Office works closely with both the Strategic Management and Planning Department and the Project Management Office. The Knowledge Management Office is in its early stages so the main current concern is building a knowledge infrastructure. The Project Management Office on the other hand, deals with project management issues and is trying to strengthen its practices and broaden its understanding. The Strategic Management and Planning Department is working to standardise the methodologies that are to be used across the organisation's projects. The Project Management Office has implemented the customised approaches of the project management institute (PMI) and PMO to deal with multiple projects. The PM offices have made an effort to recruit the best people and PMI certification is a must. The recruitment strategy is to recruit very skilled employees in various areas in IT business and management related fields, such as project management, knowledge management, information systems management, business analysis, and programming. Thus, its organisational capacity strategy follows an explicit framework in order to build its organisational capability. This includes various programmes, such as change management, the management of relations, technical and logistical aspects, resource identification and allocation, and networking.

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However, the results showed two areas of concern regarding addressing organisational capacity: first, there is no national data centre for IT projects; and most public agencies lack understanding in such areas. The Strategic Management Director believed:

“At the moment we cannot build a knowledge network across the IT industry and we cannot even make progress with this until we build a data exchange centre that allows various organisations to understand their organisation’s needs, build their own strategy and reconstruct their structure; otherwise, it is time consuming and waste of money.”

On the other hand, the findings from organisation F indicated that the organisation considers itself to be heavily regulated since it is the main regulator of internet and telecommunication companies and its organisational structure allows it to understand and address these needs. The organisation takes a strategic approach to assess its capability in terms of internal IT projects. The results showed five main areas of consideration for examining organisational capacity: the new system’s requirements, management practices, organisational resources, strategic direction and organisational culture. The organisation exercises inter-institutional connections as a strategic direction to assess the objectives of its organisational capacity. Building capacity is seen as a primary key for strengthening the development and performance of the organisation’s competencies. The results showed a degree of cooperation between the corporate communication and the communication affairs departments in identifying, evaluating and extracting external knowledge, and then combining this with internal knowledge. Qualitative and quantitative measures are used to assimilate such knowledge through analysis; this allows the Information Department to interpret and comprehend the results. Although the findings revealed that there is no explicit KM infrastructure that can apply and exploit knowledge for capacity development, the organisation employs a documentation technique instead. The Information Officer was concerned about assessing the quality of sources. He saw this as a major challenge facing organisations and commented:

“I believe that making the right decisions is derived from quality information, but the challenge is how to find such quality information; “this is easier said than done”. Quality information needs quality sources, skilled people, good management systems of delivery and organising. It needs human thinking rather than a system.”

Strikingly, the results from organisation G showed that there is a lack of a formal capacity-planning process, with reviews carried out on an ad-hoc basis, and typically for budgetary

planning purposes. Generally, such reviews tended to be reactive and were carried out by extrapolating past IT projects and utilisation trends, as opposed to predicting future needs. The result showed, however, that the need for greater formality in capacity planning was acknowledged. Capacity planning software tools are to be adopted, with capacity planning considering shrinking equipment footprint patterns and decreasing unit costs. A Project Manager specialising in data centre projects believed:

“Most decision makers want to discuss issues regarding the cost and time of delivery of an IT project, and then are concerned about the quality of such a system. At the same time, they may overlook or at least do not pay full attention to fundamental issues that are left behind.”

Moreover, another concern voiced by the Project Manager specialising in data centre projects revealed why there was an undefined and uncontrolled approach to organisational capacity based on objective findings:

“If we want to run reports across the systems, it will be difficult, if not impossible, if the systems do not conform to certain standards. We need accurate reports to support decision making.”

5.5.2 Knowledge management infrastructure

The results identified that government organisations have established various techniques regarding its knowledge infrastructure. The role of the Knowledge Management Office is to support the knowledge management culture across the organisations; this includes implementing KM into PM processes, building project repositories, and concerning itself with best practices and “lessons learnt”. Furthermore, documentation has been encouraged via the cooperation of top management with the Knowledge Management Office. Although the organisation has implemented a culture which supports KM in its business processes, the results showed no evidence of implementing KM-enabling technology. A Project Manager specialising in internal projects pointed out:

“I think we have done a great job in project management documentation, and this initiative was proposed by a strategic management officer. Its benefits are now sound, but we need more than that by establishing a well-planned system that connects sections and departments of an organisation together in a common shared system that allows everyone to search for the right information in a timely way.”

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The results indicated several challenges regarding the management of institutional knowledge. One such issue is the lack of knowledge management expertise across the region while another is that KM is not well understood by the top management since implementing a KM strategy is seen as a management fad. Furthermore, information specialists are scarce and, for this reason, public organisations depend on outsourcing. Moreover, issues surrounding decisions are still heterogeneous and only understood by experience. Individual experience is not converted into a knowledge management system since outsourcing companies take the project from scratch to its close-down. The Head of the Knowledge Management Office generally believed:

“They do not understand the advantages of knowledge exchange networks due to the lack of essential infrastructure requirements; so, they prefer their own personal business networks to sort out issues when they arise. Pro-active problem-solving systems are mostly overlooked.”

Another issue relates to the organisational maturity level and readiness in managing projects. The IT Project Consultant noted:

“The introduction of the Yesser “E-government program” has been considered to be a hub for information sharing and a project management centre, alongside cooperation with the Saudi National Information Centre, but things have not been working as expected. This has probably sped up the process of progress but government organisations are not ready for such huge changes, especially when we are talking about maturity and infrastructure.”

However, the results from organisation F showed that the organisation has implemented a separate department within its organisational structure to deal with infrastructure development. This department is divided into three kinds of activities: monitoring and operational support, implementation of infrastructure projects, and infrastructure planning. The activities are linked directly to the departments of communication affairs and corporate communication which are then linked to the Board of Directors. This technique is excellent as it allows the various parties involved in infrastructure issues to make informed decisions. However, the results showed that the organisation’s attempt to link institutional knowledge with the sources of knowledge focussed on tacit knowledge; there was no evidence of an explicit systematic approach. Furthermore, project portfolios are devised from PM perspectives although some knowledge elements, such as knowledge sharing and documentation exist implicitly. The top management encourages documentation and a knowledge sharing culture by offering workshops and

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seminars, and by setting up committees. The structure of the organisation helps in making decisions that are delegated through horizontal and vertical channels; however, the organisation lacks the implementation of KM into PM processes, and has no project repositories concerning best practices and “lessons learnt”. The Information Officer and the Director of the Communication Office made a demand that an information society should be built across the industry under the remit of public organisation information challenges. They both believed, and the Information Officer stated:

“There are misconceptions across public organisations regarding the terms of information auditing and coding. I can say that most organisations consider this a task for IT people whereas I believe it should be every department’s task.”

The Director of the Communication Office added:

“We lack skilled employees in information auditing analysis and evaluation. This is because most organisations have not implemented an independent department concerned with information sharing and documentation.”

The results also stressed that the value of knowledge management can be seen in a crisis or when the economy is down. In this regard, one of the participants, the Director of IT services, said:

“Most key performance indicators in IT projects deal with certainties, which is very beneficial, but there are loads of uncertain issues which have to be configured in advance. A risk management programme can be implemented to anticipate and predict issues alongside their various solution scenarios.”

Another issue of concern relates to employee turn-over and shuffle management which may put public organisations at the risk of losing valuable knowledge. The Head of the Business Strategy and Development Office voiced the concern that:

“Public organisations usually face what is called “shuffle management” and their key concern is regarding “intergenerational transition” which can sometimes be very risky.”

The results from organisation G examined the organisation’s attitudes regarding knowledge management resources, tools, systems and authorities and showed that the organisation has

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established various techniques with regard to its knowledge infrastructure. For example, because of the nature of the organisation and its related government agencies is complex, various business areas could be assigned to their own roles in dealing with IT project relationships, with the CIOs maintaining ongoing communication with business units and divisions. Furthermore, the organisation depends heavily on outsourcing agencies and private business partners (e.g. Company D). Most IT operational projects are executed by Company D which addresses the organisation's needs and works cooperatively with internal teams (consisting of IT departments, programmers, system designers, strategic departments, representatives of stakeholders, and the PM office).

Although the organisation has implemented certain initiatives to increase its KM infrastructure (i.e., a project portfolio, project communication management and content management system), the related agencies lack such an approach. Most of the organisation's KM infrastructure is tacit, or at least stored at an individual or unit level; this includes knowledge of technical issues and aspects, decisions making processes, and business and operational issues. Explicit knowledge, on the other hand, involves policies, processes and practice routines, standards, tools and resources. The organisation has built a solid communication and information system infrastructure, financial infrastructure, and structure. The results showed a strong foundation of knowledge sharing with outsourcing agencies and business partners, whereas knowledge sharing with its related agencies was weak. The KM system is partially enhanced but with no understanding of a comprehensive approach regarding KM practices. KM practices are considered from two perspectives: knowledge sharing and knowledge repositories. A Project Manager specialising in projects' program management and analysis believed:

“Some poor practices stem from an ignorance of characteristics of human relations in achieving a better understanding of information communities. For example, too much information is available through various online services. The question is, not how to find the information, but more importantly, how to ensure it is reliable and how this information can really help certain projects.”

The most challenging issues facing the organisation and its related agencies with regard to the KM infrastructure are categorised into four key areas. The first concerns technical issues where most advanced IT systems are either not understood by employees or are not compatible with

the system which already exists. One of the participants (a Project Manager specialising in IT projects between public and private organisations) raised this issue:

“System integration is the key issue we always face; we struggle to find related details and there is no meaningful documentation so we use our personal connections and thoughts to identify the missing key details.”

Social issues were identified as influencing the KM infrastructure as organisational culture needs to be considered from various perspectives such as trust, top management commitment, rewards, knowledge-sharing and support culture, raising awareness of goals and outputs, realistic planning, and a programme of change management. An assistant to a General Manager pointed out:

“We work at the centre of government agency networks in IT related projects to increase awareness of such practices; to minimise misunderstandings; and to communicate with the informants, stakeholders and all concerned. The network is still in its initiation stage so it is being socially not systematically constructed.”

Another critical issue relates to the lack of a policy to monitor and regulate IT projects and PM practices across public agencies. Most of the participants were concerned about this issue and one of the interviewees, a consultant to the organisation, claimed:

“As governmental organisations are trying to get connected through what is called the e-government bus services, the issues are: How can every organisation integrate its system with the e-government bus service? How to standardise systems across organisations since there is no agreed single methodology or mechanism for IT systems purchases? In addition, there is no national project, not only to monitor IT practices across organisations, but to regulate such practice.”

5.5.3 Knowledge networks: environmental and critical factors

The empirical results suggest that organisation E approaches KM activities from two aspects: a knowledge sharing culture and close integration between PM and KM initiatives. This is because the organisation is new in the area of KM, so such activities seem to be limited. The KM Office allocates resources and documentation, and cooperates with strategic management to implement KM strategy in the organisation's strategic direction. The results show that no explicit approach has been taken in terms of KBS, apart from the work-flow systems utilised to organise routine business activities. In terms of routinising business activities, the

management clearly understands the needs of business and project management, and the strategic position; these are explicitly available within the organisational strategy. The Head of the Knowledge Management Office claimed:

“I believe that the term “lessons learnt” is not utilised as a systematic organisational approach, but rather as person to person. The reason why is due to a lack of documentation, information auditing, information communities, and so on. Experience is not reviewed and passed from one to another; problems are solved based on their occurrence.”

The results of organisation F revealed how the organisation is routinising knowledge network activities in line with organisational business activities and highlighted the presence of a knowledge business activities' catalogue, with a number of services associated with service-level and operational management (end-user support services). There is clear differentiation among project management activities, with external benchmarks being used to highlight overall competitiveness and future directions. The Corporate Communication Department has identified a number of issues within the business, and further expanded on the reasons underpinning the adoption of organisation-wide policies in KM and in documentation. A number of examples concerning best practice policies have been presented by the Information Office, with the business acknowledging the need to devise such strategy in these areas. Various policies have been devised to implement knowledge-based searching and knowledge-based decision approaches. However, the priority of such activities is still ambiguous due to several reasons. The first relates to whether the organisation is able to build a solid knowledge management infrastructure and knowledge supporting culture while a second involves the skills needed in this area if such initiatives are to succeed. Furthermore, the organisation needs an explicit framework which gives details of KM activities and road maps which will suit its environment. Such a road map would increase the vision of the organisation, allowing it to link its internal and external knowledge since, at present, most public organisations consider using an outsourced company as strategic option to compensate in some of the areas where they lack expertise. The Director of IT Services thought that:

“Outsourcing of IT projects (planning, designing, implementing, evaluating and post implementation) and skills has become a more common practice among Saudi organisations as compared to years ago. They choose to outsource operational and maintenance tasks, though some of the core strategic tasks are kept within IT department teams.”

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Most of the participants believed that public organisations lack specialists such as business analysts and project managers, system application specialists, etc. This is due to the lack of cooperation between the Human Resource Office and recruitment agencies, universities and technical training institutions.

All the participants considered KM as a practical and affordable solution for public organisations but their common concern is related to linking and governing external knowledge activities. The Director of the Communication Office believed:

“The e-government programme has a good plan for transferring all government organisations to what is called e-government bus services, where information can be shared, but how they are governed and structured is still a big question!”

On the other hand, the results of organisation G explained the interrelating roles between routinising knowledge network activities and organisational business activities. The findings suggested that KM network activities are seen in two main areas: business partnerships (e.g. outsourcing agent D) and collaboration across related agencies. The business partnership arranges knowledge activities to apply KM strategy collaboratively with associated business services at a service-level and with operational management. A documentation programme has been set up between the two parties, with the outsourcing agent, monitoring its practices which include IT project classification, IT project management portfolios, and decision making based knowledge and communication management. The outsourcing agent and the organisation have employed a long-term IT plan, with the ad-hoc exercises deemed necessary, to review IT strategy in some areas. This is intended to tackle issues regarding the plan’s consistency with strategic planning. This formalised approach is designed to set high-level goals, by decreasing IT spending, providing better services, and rationalising technology, etc. The organisation has learnt from its outsourcing agent that, within the business, IT plans have not been widely discussed and little feedback has been sought. A Project Manager specialising in projects’ program management and analysis commented:

“We need to think of an approach that at least makes local “public and private organisations” able to lead most small IT projects themselves. We understand we lack skills and expertise, but we can take an opportunity to learn from good practices. This can be done by working with them in projects, attending international conferences, and so forth.”

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The outsourcing agent leads a continuous review and monitoring with regard to multiple project portfolios to ensure that they are in line with priorities; these are established from the business's strategic direction and take tactical goals into consideration. Reviews on IT projects are conducted regularly in cooperation with related departments within the organisation (i.e. the IT, financial and business strategy departments, etc.) to assess any significant changes, the business strategy, new IT opportunities, and organisational issues. Such reviews are communicated widely, with stakeholders being given a consistent and up-to-date view of all of the project's components and their relative priorities. Keeping in mind that the success of the portfolio, accountability and responsibility are clear and shared between IT and business. However, the Project Manager specialising in data centre projects believed that, even if some KM initiatives are conducted, KM practices are still little understood:

"There is misuse of knowledge management as a concept with its alliance to project management methodologies, even at an international level. Most of our employees are very industry-oriented and have taken short courses in these fields, but I believe it is not enough."

However, collaboration across related agencies in terms of routinising knowledge network activities alongside business activities is carried out only on individual basis, with a formalised method used in the communication process only for routine business activities and related business communication orders. IT projects have simple evaluations carried out against business objectives and are essentially centred on basic financial considerations. Projects are usually derived as a result of external pressure and requirements, rather than addressing business needs. A consistent approach is adopted only for financial perspectives instead of the organisation considering operational and strategic dimensions. In this regard, although most project purpose classification is agreed by both business and IT, it is still a highly subjective approach and few objective criteria are used.

The key issues identified by this study include the lack of a proper organisational structure that would allow knowledge network activities to be traced in parallel business activities; also, there are too many structural layers and this weakens the cohesiveness of decision-making processes. Furthermore, there is a lack of PM and ChM practices across related agencies, together with a poor understanding of the skills that are needed. The IT infrastructure is poor with multiple incompatible systems being implemented to arrange routine business activities while there is no data centre to develop a project portfolio which would build a robust KM infrastructure. Policies and procedures are implemented to administer business activities but these are not seen

as a strategic direction to KM. Top management support and understanding of the KM infrastructure to support IT are weak and senior managers are aware of few outside activities apart from their business responsibilities. The decision-making process is not reviewed and evaluated regularly while only low-scale reviews occur in response to problems when they occur. All participants considered that these issues constrained the KM infrastructure with a consultant to the organisation claiming that:

“Even if a project best example exists, it is very important to look for patterns and identify relationships to restructure, modify, and customise some of the items to fit your organisation’s needs. Most of the efforts being made are personal and are likely to be manual.”

Another issue of concern is the lack of PM awareness across public agencies:

“We now face a real need for national projects to instruct and administrate communication channels among IT-related industries. What we are doing now is the wrong practice; public organisations and private companies seek international companies to implement such IT systems as short-term, one-off contributions, but they are not learning and absorbing “lessons learnt”.

Understanding the connections among business activities, alongside establishing a widely shared understanding, are seen as solutions to increase the objectivity of decision making and to reduce uncertainties throughout the course of an IT project. Participants were in total agreement with need to think about such an approach to minimise uncertainty.

5.5.4 Factors influencing knowledge channels

The results indicated that government organisations manage their external knowledge networks through individual experience as no explicit approach is used. The organisations lack standardised communication management. There is overall acknowledgement of the need to formalise the approach to managing external knowledge networks with written procedures and checklists detailing the best practices; however, these are not applied consistently, but rather are used formally on some projects and informally on others. The organisations lack an explicit knowledge map (i.e., an architectural KM system) which must be adopted unless a waiver is granted. Solution selection is likely to be IT-led and is primarily centred on satisfying technical requirements. The results also showed that a more formalised approach to the management of communication or project-related proposals is recognised, with ‘template’ proposals being maintained by individuals, namely IT managers and business analysts in particular areas.

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However, there is inconsistency in the general coordination, control and support. Nonetheless, some approaches exist which are clearly focused on providing responses to service or project requests for information and proposals, with responsibilities and duties clearly laid out with regard to contract negotiations, and bid preparation and presentation; ‘template’ proposals have been maintained in line with key products and services. Although a skills alignment programme is conducted with the staff chosen either to bid or work on projects and services to ensure the suitable utilisation of skills, the area of information auditing is still lacking. A Head of the Project Office commented:

“The main issue we face is the lack of information auditors; that is why most documents we have cannot be utilised. For instance, a project portfolio is a personal matter so once there is change management, position shuffling and so on, lots of valuable data are missing.”

The results also indicated that there are many challenges which are affecting knowledge channels, such as cultural and political issues, avoidance of responsibilities, lack of trust, and insufficient experience. One of the participants believed that:

“The big issue we face in public organisations is the delegation and communication of decisions. We lack understanding of advanced decision-making practices. Most departments rely on top management decisions, rather than taking part in the process. Many reasons are behind this issue: cultural, political, avoidance of responsibilities, lack of trust, insufficient experience.”

Nevertheless, the organisation plays a central role in IT project management as it considers itself as a hub for information sharing and as a project management centre. All participants agreed that the organisation’s position in the market offers a good experience at both organisational and individual level. It has developed a consultancy team whereby individuals can be the organisation’s representatives and can gain and exchange their knowledge and expertise across the industry. The Strategic Management Director said:

“Brokers play a fundamental role in decision making but usually they have some power through the process of negotiation across stakeholders, decision makers, suppliers and vendors. Their role sometimes is invisible but fundamental.”

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The organisation has a real need for skilled people in information-related fields to transfer their individual experience into explicit knowledge. The Director of Public Organisation e-Services believed:

“Negotiation skills are not trained for or studied. It rests on personal ability to find a good deal, so it cannot be codified.”

Various customer management-centred roles are clear, but are viewed as being solely focused on high-level problem-solving or raising awareness of specific issues. Customers sometimes hold executive team meetings, although there is a lack of formal selection techniques for customer managers. Moreover, there is a lack of understanding of responsibilities and roles, with no measurement being carried out thus far, government responsibilities can be devised to related agencies. Responsibilities have been identified which focus on service level agreements through a central administration but there is little coordinated support throughout leading external projects. One of the participants believed:

“Now I think there is a necessity to introduce a national project management programme alongside a national plan that will include best practices, outsource classification, ensure that all encountered problems are identified and that solutions are explicitly shared. We also need to involve and bring together private sectors, vendors and public organisations in a programme that allows them to learn from each other and bring common and shared values. This will not only bring commercial advantages, but more importantly, develop valuable human capital and enhance vital skills.”

The participants have encouraged the implementation of a more formalised approach across the organisations in a drive to consider KM as part of day to day business activities. Architectural knowledge management, alongside establishing a knowledge management culture and infrastructure, is seen as a strategic direction for the organisation E. The Head of the Knowledge Management Office strongly believed:

“I think knowledge networks are not organised enough to support information and expertise exchange; for instance, every organisation has its own alliances, vendors and partners which are not shared with other organisations, even if they work in the same industry.”

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However, the findings of organisation F suggested that, for internal organisational activities, the organisational structure plays a fundamental role in connecting decision makers and key actors to the sources of knowledge. An analysis of the knowledge clustering underpinning the organisational structure brings demographic meaning and understanding whereby dynamic linkage of knowledge can be generated. The Head of the Project Office highlighted the role played by the ambiguity of tasks in the decision-making process and commented:

“The public organisations and job roles have to be reengineered. What I experienced as a project manager is that there is overlapping and conflicts between job roles and tasks causing ambiguity in decision making and responsibilities.”

However, external knowledge networks are influenced by various factors, one of which concerns the explicit procedure for the movement of knowledge across related industries. The results revealed that it is easy to be systematic with business networks (i.e. business partners, customers and suppliers), but linking internal knowledge networks to external ones is still a challenge. One of the challenges is identifying knowledge sources, as well as exploiting such knowledge. A strategic option could be to target the characterisation of knowledge movement by identifying knowledge channels. The Director of the Communication Office suggested:

“If I was in charge (of the e-government programme), I would make sure [that]there was rethinking about IT suppliers and vendors, that clear regulations and policies were in place, and that good companies were certified and classified with public organisations being forced to follow guidelines in dealing with outsourcing parties. They would have to report any problem that occurred, share best practices, create formal and informal public organisations in a community of practices, build training centres for public organisations to raise their maturity, understand strategies and make them recognise the importance of involvement in decision making.”

The results also pointed to a direct link between internal communication management and external knowledge channels. Most participants were of the opinion that internal communication management facilitated the identification of external knowledge. This is because codified knowledge is usually targeted by a high proportion of users across the organisation while uncoded knowledge is usually targeted by those who require it at a certain time. The organisation sees the role of the Corporate Communication Department as taking a strategic approach not only to connect employees and top management to knowledge that is

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needed, but to identify hidden knowledge across the organisation. In this regard, the Information Officer pointed out:

“Unfortunately, most of our IT employees are skilled in the IT aspects of systems, but I think we need people who work with us understand business needs. It is not only technical concerns we face, but also many areas in business need greater understanding.”

The structure of the organisation provides an insight into how explicit and defined internal communication channels can solve some important decision-making issues. The Director of the Communication Office believed:

“Decision makers rely on the information derived from people, systems and various tools, so these channels are the pipelines to decisions.”

Also, the results indicated that most of the common issues in public organisations are related to decisions that are usually centralised and only top management makes such decisions. Decision-supporting mechanisms are not enhanced or understood so conflicts occur as a result of the inaccuracy of some of the information provided.

With regard to knowledge intermediaries, all participants viewed this factor as fundamental in IT project management as a result of the growth of outsourcing. The Director of IT Services said:

“Any project in general needs to be communicated from the project’s start to the project’s close. A good project manager is someone who is able to identify relationships in communication, who knows “how and who” to communicate. This has to be outlined alongside the project charts.”

Brokering roles were seen to bring solutions to organisational issues, which might include cultural, political and decision-making issues, at the planning stage. The Director of the Communication Office asserted:

“When planning a project, the main concern is to tackle political, cultural and decision issues; this is more important than just setting a budget and a timetable.”

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Moreover, some of the most vital roles of brokering are related to information auditing, allocation and identification. Most participants raised a fundamental issue facing public organisations: this relates to the lack of reported errors that cause organisations to fail to learn lessons. The Director of IT Services expressed the following concern:

“Most incomplete or failed projects are not analysed and are usually abandoned without a proper study. Some of them are discussed through personal contacts but not as an organisational effort.”

The Director of the Communication Office considered KM to be a critical solution for unreported project failures and noted:

“Although we have such advanced IT systems, what we really need is a knowledge management system that cares about the concept of knowledge management practices to facilitate systematic internal and external communication channels.”

The Information Officer referred to the term “lessons learnt”, the process of learning from errors, said that errors should be reported and shared. He claimed:

“Lessons can be learnt by learning from your errors, but errors have to be explicitly available, evaluated and solutions provided. Most conflicts in communication are linked to unreported problems, where evidence is not supported, or where key information is missing.”

The results demonstrated that the structure of a knowledge network needs to identify sets of networks and define each network in clustering knowledge. The Director of IT Services and the Information Officer believed that turning the architecture of a knowledge network into an automated system is a similar approach to what is called a business intelligence (BI) system. This requires the transfer of human knowledge into a practical solution that can be designed and eventually automated. This depends on the establishment of an entity relationship (ER) diagram which needs to be explicit, with all related elements well defined. However, the participants believed that public organisations lack the essential skills in information management. As the Information Officer pointed out:

“Coding knowledge is not an easy task. We lack experience in this area and that is why we usually outsource for our needs for the time being.”

On the other hand, the results of organisation G revealed that there is overlap between business and IT projects with regard to assessing external against internal knowledge. Although there is some basic assessment following initiation, with the application of business cases, a number of the projects are not systematically examined and reviewed jointly with business partners and related government agencies. For example, there is some degree of formal project ownership and sponsorship, but any significant re-evaluation following the start of a project to assess its benefits or priorities against other projects is notably lacking. Importantly, any degree of ongoing prioritisation is mostly subjective or based on the views of the outsourcing company. The organisation lacks consistency in its approach to understanding the on-going priority of each project as a result of a lack of fundamental KM tools.

Although the organisation has adopted several methods to outsource procurement to a third-party in order to benefit directly from the support and expertise of experienced procurement specialists, KM is not applied as a strategic approach. The outsourcing company applies its KM approach but this is a short-term, one-off technique which lasts only throughout the project. This approach has weakened the organisation's ability to define its strategic style in terms of the creation of an internal knowledge management team, as well as its structure and processes. A Project Manager specialising in data centre projects asserted that:

“Bringing in part-time experts in IT, information and business will not only reduce the cost of outsourcing, but will make organisations ‘learning organisations’ which will serve well in the long run.”

The results also showed that knowledge network externalities face several interrelated issues. The first concerns the organisation's outsourcing strategy which has an impact on the overall ability to define its approach for managing external knowledge. For example, external knowledge is only understood between the outsourcing agency, top management, decision makers and IT people. However, the knowledge of divisions and units is not systematically observed as knowledge sources are not connected. The organisation also depends heavily on outsourcing agents to search and assess external knowledge based on the particular requirements of the project. All of the participant believed that outsourcing agents are a fundamental source of knowledge, but that internal communication channels have to be effectively managed and planned to identify knowledge that can bring value. A consultant to the organisation revealed:

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“There is always a gap between external and internal information so, to bridge this gap, you will need to appreciate and familiarise your organisation with external resources, to learn by doing, to try to encourage documentation throughout your organisation, and convert subjective thoughts into objective ones.”

Most of the participants believed that one of the key approaches to facilitating the process of information and knowledge sharing would be to reengineer the organisation's structure for this purpose. However, most public organisations are not willing to reengineer their structure due empowerment issues; this increases ambiguity in the decision-making process and also in KM issues. An Assistant to the General Manager thought that:

“Communication issues have to be well evaluated and classified. Top management has to take full responsibility for ensuring that communication channels are not broken or interrupted by giving full support.”

Using knowledge intermediaries is considered as a strategic approach for most public organisations. The results revealed that the organisation considers knowledge brokering as the main agent to connect knowledge networks with business activities in IT projects. Identifying knowledge brokers is crucial throughout all the phases of IT projects. The knowledge brokering approach has been used in this organisation for several reasons which relate to the following: a lack of collaboration among public agencies, divisions and units; a lack of coordination among IT project management key players; a lack of procedures used to identify, search, assess and connect specific knowledge; a lack of understanding from top management of the nature of IT PM; a lack of programmes to increase understanding among PM teams; and a lack of expertise in IT PM at both organisational and individual level. The organisation considers knowledge brokering as a method to increase organisational learning and a Project Manager specialising in IT projects between public and private organisation believed:

“I think third parties and outsourcing companies should work within the teams of the organisation, such as in IT systems' intervention, from the process of planning until evaluation. This should be the emphasis in such a contract.”

Another participant, a consultant to the organisation, highlighted the need for an effective approach towards recruitment to increase organisational skills:

“Most IT departments do not have qualified people who understand business processes, issues and organisational structures which are the primary key for success. IT departments need to

rethink their employment approach and recruit skilled people from different backgrounds, especially from the field of business studies.”

Moreover, the organisation needs to define its approach to combining various practices in order to increase its understanding and performance of IT PM. An Assistant to the General Manager noted:

“Local vendors are good at understanding local issues in public organisations, but they usually lack knowledge of various systems and features. International vendors, on the other hand, sell good systems with many options but it is really difficult for them to understand our business issues and needs. So, we have to work both ways and this cost lots of money and time, alongside unavoidable errors.”

Knowledge brokering is seen by the organisation as playing a fundamental role in mapping, simplifying and interpreting different types of knowledge, thus facilitating ease of understanding. All of the participants agreed that the business aspects of an IT project need further attention and should be regularly maintained. A consultant to the organisation mentioned:

“Some of the contracts include training employees on the uses of the new system, but it is not the main issue and it is not enough. We need some training in core things, such as project management, evaluation, business analysis and system implementation. These will raise the awareness and maturity of organisations.”

The results showed that an approach is needed to connect knowledge sources, decision making, and both internal and external knowledge. The organisation has adopted an enterprise resource planning system (ERP) but this has not been used to facilitate KM activities; instead, it was implemented mainly to connect business activities with decision making.

5.5.5 Knowledge networks' initiation in IT projects

Based on the results, organisation E has shifted to a second phase strategy and is now aiming to launch more strategic cooperation with a view to knowledge mobilisation. The first phase focused on internal networks and how to organise its knowledge activities and infrastructure, as mentioned earlier. The second action plan is to collaborate with relation to government agencies and to try to pull consulting firms and international consultants into their pool of knowledge. Top ministries are to be involved and stakeholders will be targeted in order to develop a strategic perspective for the future of e-Government in Saudi Arabia.

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The organisation has adopted two approaches in trying to plan its IT projects. The first approach relates to its internal projects where IT projects funding remains centred on whether the capabilities provided will enhance margins in the medium- or short-term. Project approval is determined in line with the corporate strategic agenda. This could comprise the evaluation of improvements across boundaries, with a programme, or projects and priorities, being established with regard to the overall risk and strategic portfolio. The IT department, Project Office, KM Office and Strategy and Planning Department work on a project proposal by implementing an examined framework that is set and approved by a project committee. The organisation has already established certain alliances with international vendors and consultants who work closely with them and monitor their projects. These alliances are needed to supervise, teach and detail progress for the organisation's employees in an attempt to feed documented knowledge into their system.

The second approach is monitoring external IT projects for public agencies. The organisation has a formal policy that is clearly set out for public agencies to follow, thereby allowing such agencies to introduce certain services into e-Government Bus Services (GBS) although the organisation does not involve itself in managing projects for public agencies. However, all projects with an infrastructure component implement consistently formal selection procedures in order to choose the most cost-effective solution. In terms of software and hardware which lack the organisation's prequalification, the procedures in place centre on a request for information (RFI) preparation, and a request for proposal (RFP) management. The evaluation of suppliers' proposals is based on what is required in terms of coverage, security, control, performance, scalability, the availability of vendor staff to support the product, the vendor's overall commitment to developing and enhancing the product long-term, conformance with industry standards, the number of installations performed, training quality, and the quality of documentation. Then, the results are documented and validated by supplier visits.

The organisation, together with related stakeholders, has agreed to introduce representatives from government agencies' programme. This programme offers workshops and discussion groups to raise issues regarding IT projects and practices, as well as increasing knowledge sharing and raising awareness. Being at the centre of the e-government transformation process, the organisation has built a strategic approach and has also launched another programme for consulting companies and IT project developers who have worked in IT projects in related government agencies join the GBS. This programme allows the organisation to collect

significant feedback that is essential in determining future directions. The Director of Public Organisation e-Services said, in this regard:

“The second phase of development concerns mainly changing the culture of the community practices in IT project-related factors among government agencies’ employees rather than increasing an understanding of technological solutions.”

The Head of the Knowledge Management Office strongly advised:

“There is an absence in terms of the government’s role in trying to control the vendors of IT products and services. What I mean here is we need public organisations to work as partners with private organisations rather than working as “vendors vs customers” or “suppliers vs clients”. More cooperation is needed to build a strong information-sharing economy.”

The findings of organisation F revealed various practices regarding knowledge networks’ initiation in IT projects; these practices related to the project’s size and type, whether it was strategic or not strategic, whether it was a development or a new system. Different practices follow a set of plans. For example, if the project relates to a specific department or unit, the department is responsible for aligning the project to the overall aims of the organisation’s strategy; the communication process is also usually under its control. On the other hand, if the project is core and large, various parties, such as the PM office, IT department, Corporate Communication Office, Finance department, and some of the director board members, will be included. The organisation follows sets of criteria that are outlined in the overall organisational strategy. Thus, a formal project initiation phase is conducted, with a clear path between the inputs and outputs, while the plan is refined in line with the organisation’s capabilities. Usually, core projects are outsourced, with the organisation having already established strategic outsourcing partners to work with collaboratively in order to meet the organisation’s needs. The PM offices of both parties are assigned to follow the PMI standard of PM. The documents have to be shared and the progress is tracked against the plan. The results revealed many issues, irrespective of the overall success rate of the IT projects implemented. The first issue was overreliance on the outsourcing company which might result in the loss of valuable documents not stored in the knowledge base. In this regard, one of the participants mentioned:

“When the economy is down, both local and public organisations are incapable of utilising IT facilities independently so, in this case, I have no idea what they are going to do.”

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Another issue related to the turnover of knowledgeable employees who could be head-hunted by the outsourcing company to offer them higher salaries. One of the participants voiced the concern that:

“Most highly qualified employees are looking for higher salaries so there is a high rate of turnover and this puts organisations under pressure. Unfortunately, no proper solution exists to stop this leak.”

Furthermore, the cost of outsourcing is increasing since the company tends to recruit skilled and highly intellectual employees in various areas. This issue has become common in public organisations, as one of the participants, the Director of IT Services, claimed:

“Knowledge management and information management are new areas in the industry. Most experts work in universities so they only work with us as consultants so the cost is very high and we have shortages across the country in these areas.”

Other issues are interrelated but mainly concern the lack of a knowledge management system that could be implemented in line with the overall organisational strategy. The Head of the Business Strategy and Development Office believed that:

“International companies, and even some of the private local companies, care about project documentation for two obvious reasons: time and cost.”

On the other hand, the results of organisation G highlighted two approaches that are used to initiate knowledge networks within IT projects. The first method is to use an outsourcing agent (D) which manages the external networks; these include planning, developing, maintaining, negotiating and contracting. The second method is used for related government agencies where the organisation plays role as a knowledge broker between the parties. The organisation has created a PM office within its structure to work closely with the outsourcing agent and related internal departments. Since documentation is the main key to facilitating the foundation of knowledge networks in the initiation phase of an IT project, the outsourcing agent adopts the PMI standard and KM approach to manage a project within the organisation. As explained in above, Organisation G adopted a similar approach with its outsourcing agent and so customisation could occur based on the nature of the project. Since the outsourcing agent in this case has been a strategic business partner for several years, most organisational and

technical issues are already stored in the KBS of outsourcing agents and shared with their business partner. Thus, this approach allows the organisation to implement most of its IT projects successfully. However, two shortcomings of this are, firstly, the high cost and, secondly, the lack of KM practices within the organisation which means that opportunities to learn from its partner are lost.

The second approach involves monitoring external IT projects for public agencies. The organisation has a clear and formal policy for public agencies to follow; this allows public agencies to plan their IT projects. Related public agencies have their own outsourcing agents and business partners who have built and implemented their basic IT infrastructure and networks. However, for large IT projects, sets of committees are established among various parties to assign roles and responsibilities. The main issues that have been identified relate to overlapping roles and responsibilities, having various stakeholders and therefore unclear ownership, conflicts and questions of empowerment. A Project Manager specialising in the program management and analysis of projects said:

“Some of the stakeholders are also project owners, so a good project management team will identify all possible ways to involve the right stakeholders who can influence decisions and who can raise awareness about it.”

Another participant explained how decision making issues could be solved through the use of documentation and a project portfolio:

“You will need to gain a sense of “buy in” from stakeholders and the project owner. Most of them need a project manager to anticipate and identify problems alongside the potentials, suggest courses of action based on accurate data, and point out consequences. This cannot happen without a well-articulated project portfolio.”

Moreover, all the participants confirmed the fundamental role of communication and networks during the initiation phase in resolving conflicts and issues, and in minimising uncertainties:

“Conflicts of interest are one of the main concerns as some of the project owners are the stakeholders and vendors at the same time, escalating conflicts in organisations.”

5.6 Conducting the case comparisons

The patterns and themes of the seven case studies were examined to highlight the similarities and differences among them. This was done to generate new meaning and develop a deeper

understanding of the cases themselves. For example, one pattern that was identified is that the KM infrastructure was considered to be a driving factor in building, maintaining and expanding knowledge networks in International Companies A and B, Private Local Companies C and D, and Government Organisation E whereas the lack of KM practices in Government Organisations F and G influenced the organisation's strategic direction towards outsourcing. Further examination of these differences led to the development of those factors influencing knowledge channels in IT projects and to describe the actions that organisations used to strengthen their KM infrastructures. This helped in gaining a common understanding of the core objectives and ideals for structuring knowledge networks as a strategic direction.

This section starts by linking the identified themes to the previously established knowledge networks. Following this, the work highlights the similarities and differences among the cases in terms of their knowledge network practices and potential critical issues and factors. Finally, empirical evidence in the findings is highlighted and further explained.

5.6.1 Linking the identified themes to knowledge networks

An analysis of the results indicated interrelated connections between the identified knowledge networks and their related themes (the evaluated CMKNM 2 see Figure 5.3). Figure 5.3 explains that institutional knowledge networks are driven by the preservation of organisational data, resources and tacit knowledge. The preservation of such is translated into procedures and policies where organisational strategy and structure are formulated, and an organisational culture is defined. The institutional knowledge networks combine explicit resources, systems and tools, and these assets are enhanced and accompanied by assigned roles and responsibilities formally delegated by authorities. The findings explained the fundamental components of institutional knowledge networks, which are: allocating, processing, authorising, utilising, preserving and producing knowledge. Among large agreement, two extracted pieces of evidence supported the link between institutional knowledge networks and the themes that were identified. This is mentioned in Sections 5.2 and 5.3.2.

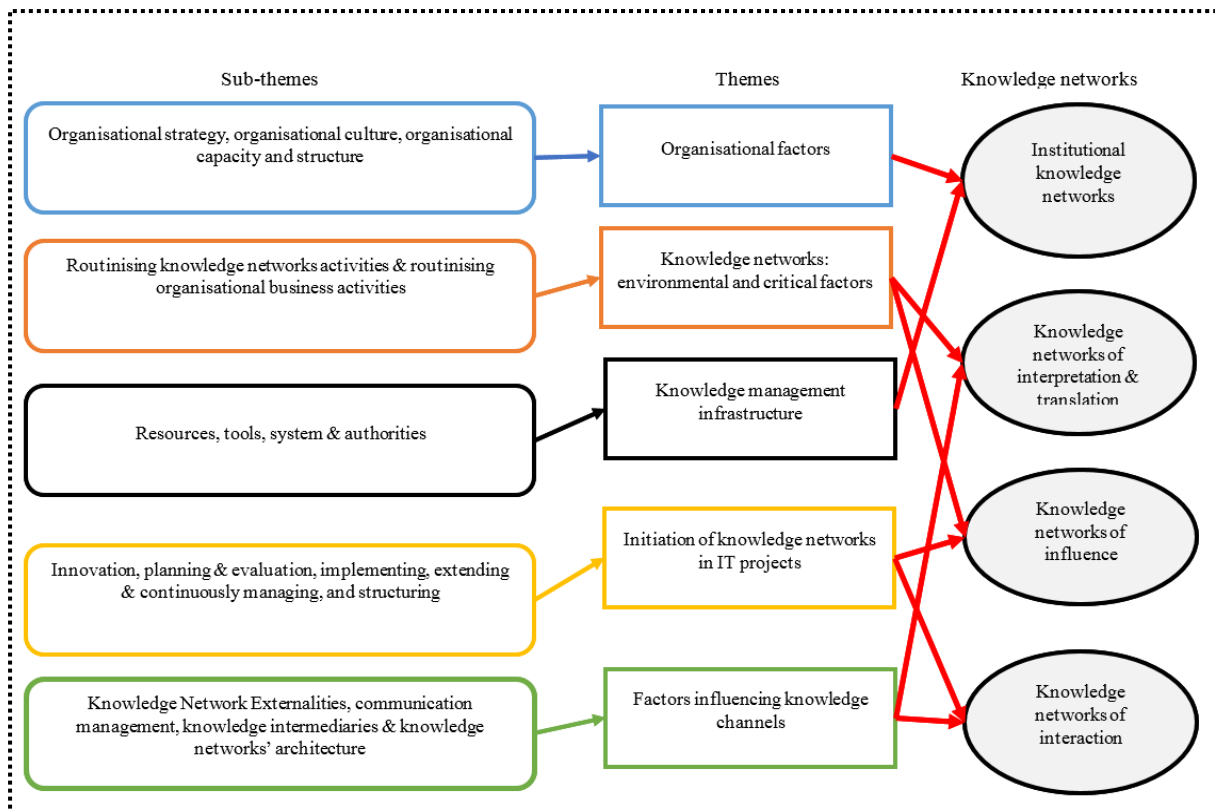


Figure 5.3: The identified knowledge networks and their related themes (evaluated CMKNM 2).

Knowledge networks of interpretation and translation play important roles in facilitating an understanding within a complex set of interactions across networks activities and organisational business activities. They provide a “helicopter view” of the network’s business activities and connect various parties involved in a project in common topics. They comprise the processes of customising, conceptualising, codifying, evaluating, specifying, adopting and simplifying knowledge to solve problems, enhance decision making, and improve outcomes. In order for different departments to collaborate successfully to overcome issues and hurdles, it is necessary for decision making to be shared with lower-level employees. Staff are more likely to recognise the advantages of change if the links between departments are strengthened and decision making is spread across the company. This can be achieved by considering fundamental factors, such as knowledge network externalities, communication management, knowledge intermediaries, and the architecture of knowledge networks. Overlooking interactions between key activities and key players when selecting change management strategies to support decision making at all stages, is a key factor in failure. An extracted piece of evidence suggested the link between knowledge networks of interpretation and translation, and related themes that were identified. Among large views, A Project Manager claims

“The failure of IT projects is often related to poor decision making in the pre-planning stages as many decision makers overlook change strategy in IT projects.”

Another item of evidence was suggested by the Information Officer and it was viewed by all participants:

“Coding knowledge is not an easy task. We lack experience in this area and that is why we usually outsource for our needs at the time being.”

Knowledge networks of influence constitute a set of actions consisting of several elements: knowledge enhancement, driving knowledge into action, delivering the right knowledge to the right place at the right time, increasing understanding of specific knowledge and facilitating procedural knowledge, and communicating “lessons learnt”. Influential actors, as highlighted during the interviews, aim to bring together various parties based on common knowledge of issues. The aim is also to raise concerns, offer best practice guidelines, and bring together knowledge sources and decision makers. Thus, knowledge networks of influence can play interrelated roles in developing a common understanding of knowledge network activities, as well as changing or influencing business networks. Two main pieces among high number of evidence were extracted from the results to highlight knowledge brokering activities which are usually overlooked due to insufficient knowledge documentation, translation and interpretation (For more evidence refer to section 5.3.5). A Private Sector Project Manager asserted:

“Organisations must embody, assess, translate, interpret and understand knowledge brokering activities as part of their strategy.”

Knowledge networks of interaction play a significant role in connecting knowledge networks, bridging the gap between external and internal resources and connecting knowledge networks of interaction (tacit knowledge) to knowledge networks of interpretation and translation, thus converting it into explicit knowledge. This is particularly important in the initiation phase of IT projects; it also provides a clear route for addressing issues regarding knowledge network externalities, communication management, knowledge intermediaries, and knowledge network components. An item of extracted evidence, voiced by a Project Manager, suggested:

“Project delays or failures are attributed strongly to the lack of transparency, especially in the planning stage. Transparency is the key to put everything on the right track and move further.”

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Interviewees explained that knowledge network activities can be categorised into external and internal activities. The former includes resources, knowledge brokering and social activities whilst the latter includes governing and managing networks, stakeholders' engagement, the identification of project owners, norms and routine, the cultural and social characteristics of an organisation, collaborations, and communication activities.

5.6.2 Similarities and differences between the cases

The Table below 5.2 sheds light on various practices regarding knowledge networks in IT projects, together with potential critical issues and factors. Based on the previously discussed themes, five main categories were generated to enhance the comparative analysis across the cases. These categories are: knowledge networks as a strategic approach, knowledge networks to routinise KM and business activities, how KM and knowledge systems are used, knowledge networks' initiation in IT projects, and knowledge brokering and intermediaries. The findings suggest that international companies tend to practise similar approaches to knowledge networks, whereas International Companies A, B and Private Local Companies D have implemented knowledge networks as part of their strategic direction while Private Local Company C has employed knowledge sharing to facilitate knowledge activities. Government Organisation E has implemented a KM office within its organisational structure and has begun to establish a knowledge network framework. Significant differences were found in Government Organisations F and G who employed corporate communication practices and outsourced their KM strategy since KM was not internally implemented in either company.

Table 5.2: The similarities and differences between the cases

Cases	Categories				
	KNs as a strategic approach	KNs to routinise KM and business activities	KM & KN systems	KNs' initiation in IT projects	KBs & KIs
International Company A	Explicit knowledge networks implemented within the organisational strategy.	KNs implemented, comprising projects' management, incentive systems, knowledge network identification, top management commitment, controls & audit, managing external changes, development & implementation. and people management.	KBS system includes knowledge mapping system	<ul style="list-style-type: none"> ➤ Capturing of corporate knowledge carried out across all key projects. ➤ Transition procedure applications. ➤ Corporate guidelines across fundamental projects. ➤ Lessons incorporated into the organisation's KM procedures 	KBs & KIs viewed as relevant and integral in negotiation, interpretation, communication and enforcement processes.
International Company B	Knowledge networks considered as a strategic approach.	A systematic approach is applied to ensure critical projects are implemented by strong supplier management approaches. Shift to project-driven IT structure, multi-disciplinary IT teams of analysts, designers and programmers being assembled by the need for project resources, skills and experience.	KM system includes knowledge map programme and consultancy programme.	<ul style="list-style-type: none"> ➤ Shifting its IT projects to business systems-orientated structure. ➤ IT groups aligning their efforts with the support and development of applications for specific areas, generally with the central internal programming group and business group. 	Implementing a programme called Experience-oriented statements & identifying key players' liaison committees.

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Private Local Company C	Knowledge sharing and knowledge storing as strategic approach.	Service catalogue facilitates insight into related products and services across business activities. All marketing activities are detailed in a marketing database, including resourcing, people development, supplier communications, Sourcing, and bidding and contracts.	Workflow system & PM portfolio.	<ul style="list-style-type: none"> ➤ Project management portfolio. A consistent approach to the management of the programme has been somehow utilised. ➤ More formalised approach across the firm with the intention of considering projects as part of a more wide-ranging portfolio. 	External KNs by experience. No explicit framework has been used.
Private Local Company D	Explicit KM & KNs.	The knowledge analysis group, formed from different departments, Concerned with routinising organisational business activities. The KM office tracks alignment between project management strategy and organisational strategic direction.	KBS system includes: Living Document Platform system.	<ul style="list-style-type: none"> ➤ A formalised and structured approach to establishing projects. ➤ A flexible model for prioritisation ➤ A systematic approach is updated on a continual basis to ensure activities are currently in line with best practice and experience. 	Is a strategic partner with several industries, including education, IT international suppliers, IT local suppliers, government agencies, and international exhibitions.Consultancy group scheme established.
Government Organisation E	Explicit KM and, to some extent, explicit KNs.	KM activities from two aspects: knowledge sharing culture and close integration between PM and KM initiatives. Role and responsibilities are well configured as a strategic direction in line with its KM plan.	KM system and KBS.	<ul style="list-style-type: none"> ➤ Shifted to second phase strategy. Aiming to launch more strategic cooperation with regard to knowledge mobilisation. ➤ Internal networks and awareness of how to 	The organisation plays a central role in IT project management as it considers itself a hub for information sharing and as a project management centre.

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				<p>organise its knowledge activities and infrastructure.</p> <ul style="list-style-type: none"> ➤ Collaborates with related government agencies in trying to pull in consultancy firms and international consultants into their pool of knowledge 	
Government Organisation F	Communication affairs and corporate communication practices. Implicit KM programme.	<p>A presence of knowledge activities and business activities' catalogue.</p> <p>A programme focused on documentation events.</p> <p>Corporate communication is centred on key services and business activities.</p>	Workflow system, ERP system and project portfolio.	<ul style="list-style-type: none"> ➤ Various parties are included, such as PM office, IT department, corporate communication office, finance department and some director board members. ➤ The organisation follows sets of criteria that are outlined in the overall organisational strategy. ➤ Formal project initiation phase is conducted, with a clear path between the inputs and outputs. 	<p>Brokering roles seen to bring solutions to organisational issues at planning stage.</p> <p>Uses corporate communication department as the strategic approach to KBs & KIs.</p>
Government Organisation G	Outsourcing strategy to KM with no KM implemented internally.	KM network activities seen in two main areas: business partnerships (outsourcing agent D) and collaboration across related agencies. The business partnership takes	Workflow system & ERP used but not for KM purposes.	<ul style="list-style-type: none"> ➤ Identifying knowledge brokers is crucial throughout all the phases of IT projects. 	<p>BKs & KIs are considered as a strategic approach.</p> <p>The company considers knowledge brokering is</p>

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		charge of arranging knowledge activities to collaboratively apply KM strategy to associated business services at a service-level and for operational management.		<ul style="list-style-type: none"> ➤ The first method is outsourcing to agent (D) which manages the external networks, including planning, developing, maintaining, negotiating and contracting. ➤ The second method is used for related government agencies where the organisation plays a role as a knowledge broker between related parties. 	the main agent to connect knowledge networks with business activities in IT projects.
Abbreviations : KNs= Knowledge networks; KM= Knowledge management; KBs= Knowledge brokering; KIs= Knowledge intermediaries					

5.6.3 Factors affecting knowledge networks in IT projects

In order to achieve a sound conclusion, the researcher condensed a great amount of data into more specific themes and patterns (Miles & Huberman, 1994). The data formed the basis for the case analysis explained in the previous section while factors affecting knowledge networks in IT projects were summarised using cross-case analysis on the data collected from seven organisations alongside two independent consultants. The frequency measure technique was used to examine the empirical evidence and to make the cross-case analysis more understandable (Rihoux & Ragin, 2008). Such a technique utilises various markings: e.g., triple ticks (√√√) represent strong evidence, double ticks (√√) moderate evidence, a single tick (√) weak evidence and a blank means there is no evidence (see Table 5.3). The decision to select triple, double or single ticks was intended to highlight the strengths across the identified factors. Thus, the greater the number of ticks, the stronger the finding in the corresponding factor.

Table 5.3: The frequency measures used to carry out cross-case analysis (source: Rihoux & Ragin, 2008)

Scale	Symbol	Frequency of occurrence
No evidence	blank	Zero
Weak evidence	√	Between 1 and 4 ($1 \leq x \leq 4$)
Average evidence	√√	Between 5 and 8 ($5 \leq x \leq 8$)
Strong evidence	√√√	More than or equal to 9 ($9 \geq x$)

The next section discusses, respectively, organisational factors, knowledge networks' environmental and critical factors, factors influencing knowledge channels, knowledge management infrastructure factors, and knowledge network initiation factors in IT projects.

5.6.3.1 Organisational factors

The section explains how organisational factors have to be aligned using the identified knowledge networks (see Chapter two, Figure 2.2). The conceptual framework presents the knowledge networks and connections that enable key knowledge mobilisation factors to be aligned. These include organisational culture, strategies, capacity and the knowledge infrastructure. Furthermore, this allows knowledge channels to be traced in order to connect procedural knowledge to “lessons learnt”, thereby enhancing support for decision making in

strategic interventions in IT project-oriented change management. However, the empirical findings revealed further evidence on KNs nature. For example, there are interrelated links between organisational strategy, culture, capacity and structure; these can be facilitated by the knowledge infrastructure to achieve a greater understanding of the key knowledge mobilisation factors.

Table 5.4 illustrates the empirical evidence used to confirm these interrelated links among the key knowledge mobilisation factors. The factors were identified through the first order codes to generate sub-themes and main themes (see Appendix E). As discussed previously, the analysis was utilised to work back and forth across the seven cases and the two consultants. The last row of the table provides the legend that was explained in Table 5.3 and the abbreviations of the two consultants as (TC). Four main factors that facilitate KNs and knowledge channels in supporting knowledge mobilisation and knowledge sharing within and across organisational boundaries were identified. Organisational strategy was asserted by the participants to be one of the most predominant factors assisting KNs in innovative and implementable IT projects. It is considered as the degree to which organisational strategies are consistent with both ChM and KM strategies that have been selected and aligned with business objectives at an early stage of decision making. Strategic management is a predominant characteristic of international companies and, to some extent, of private local organisations. For example, one such strategy is to extract cultural knowledge from private local companies and to have those local companies as partners in dealing with projects of government organisations.

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Table 5.4: Empirical evidence in key knowledge mobilisation factors

First-order code	Factors	Support from cases for organisational factors							
		A	B	C	D	E	F	G	TC
<p><i>“Most organisations and even departments search for good options or the right information by their subjective efforts and analysis, thus overlooking their organisation’s characteristics and culture.” IT Project Consultant</i></p>	Organisational culture	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
<p><i>“There should be clear awareness of the purpose of IT by business and IT.”</i></p> <p><i>“There has been a recognised need for a more effective and formalised approach to organisational strategy and business planning.” Project Manager</i></p> <p><i>“A lack of consistency in the strategic planning approach means IT directs its very best efforts towards planning a response in line with a combination of business and IT goals.” IT Director</i></p>	Organisational strategies	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
<p><i>“The project portfolio will need to undergo continuous review and monitoring so as to ensure alignment with priorities established from the business strategic direction and bearing in mind tactical goals.” Project Manager</i></p> <p><i>“The most important and challenging issues in IT project are capacity assessment and development; they require skills and organisational knowledge.” A Strategic Management Director</i></p>	Organisational capacity	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓

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<i>"If decision making is not delegated further down the hierarchy in planning stages, departments won't work efficiently together, and organisational barriers interfere with the ability to satisfy the overall results."</i>	Organisational structure	✓	✓	✓	✓	✓	✓	✓	✓	
		✓	✓	✓	✓	✓	✓	✓	✓	
		✓	✓	✓	✓	✓	✓	✓	✓	
Legend: strong evidence - ✓✓✓, average evidence - ✓✓, weak evidence - ✓, no evidence - [blank]. The two consultants: (TC)										

The findings also revealed that organisations often embrace a competitive culture and silo mentality, meaning that there is a call for greater insights into the nature of culture with regards to power, maturity and diversity. The interviewees stated that it is not feasible to propose a change strategy until relevant cultural factors are addressed; this was their key focus amongst the most challenging aspects involved in change projects. The interviewees also added that, in most cases, there is little support for problem solving, with opportunities for learning limited due to a lack of open conversation about things that have gone wrong.

Organisational capacity refers to an organisation's financial, technical, functional, operational and organisational readiness for change, including the readiness of its employees, and its ability to fully understand, welcome and implement change across all of these levels. The consensus amongst interviewees was that organisational capacity issues, such as budget, infrastructure, IT structure, the organisation's experience with IT, the availability of resources, and the readiness of specialists, must be properly addressed prior to IT system's implementation. Resource allocation is amongst the main factors involved in the success of IT projects, as noted by the two consultants. The findings suggest that there is a high level of concern about policy and procedural issues, particularly with the introduction of new IT systems in an organisation. For instance, international companies and private local companies lay the charge at the door of government organisations in terms of the lack of clear policies and procedures. Ambiguity in the goals and objectives of a project causes a lack of coordination among divisions and a lack of co-operation among external industries. The interviewees explained the importance of having clear policies, procedures, projects, objectives and requirements; these facilitate an organisation's effectiveness by eliminating political issues.

An organisation's structure is identified as playing a significant part in, not only administering the routine communication channels within the organisation, but also suggesting and

implementing various knowledge management methods to support organisational learning and create a knowledge-sharing culture to support decision making.

5.6.3.2 Knowledge networks: environmental and critical factors

The results explained the key factors which influenced knowledge networks in routinising their activities in line with business activities. The relationships across various parties involved in an IT project need effective internal and external communications. This is because actors, vendors, suppliers, stakeholders, project owners and project managers have their own goals and objectives so their organisational and individual visions will be diverse. The feasibility of a knowledge network offers more understanding and greater commitment to engage with business change, to communicate with business divisions, and to identify, monitor and address IT project requirements. The results from the cases highlighted various factors that have an impact on knowledge networks and emphasised the need for key organisational factors and the strategy of knowledge networks to be aligned. These factors are grouped into routinising knowledge network activities and routinising organisational business activities. These factors were generated from the themes, sub-themes and first-order codes. Table 5.5 describes the factors in line with the frequency measures explained in Table 5.3.

Table 5.5: Empirical evidence regarding the environmental and critical factors of knowledge networks

Categories	First-order code	Factors	Support from cases for organisational factors							
			A	B	C	D	E	F	G	T C
Routinising knowledge networks activities	<i>“Top management involvement is the key in initiating such a knowledge network, building its strategic direction and committing to its objectives.”</i> Strategic Management Director	Top management commitment	✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
	<i>“All development projects are involved in an active internal audit scheme, although the review scope might be limited. Technically complex software or sensitive applications might be afforded external, independent specialists in review completion, with business process review considered.”</i> Business Analysis Director	Controls & audit	✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
	<i>“If there is inadequate integration of managing external change with corporate functions and business units, there will no actual involvement in compliance-related projects and awareness of where change should be applied.”</i> The Head of the Knowledge Management Office	Managing external changes	✓	✓	✓	✓	✓	✓		✓
			✓	✓		✓				✓
			✓	✓		✓				✓
	<i>“Lacking any consistent mechanism in communication via the management structure causes the business units to be unlikely to establish and directly communicate their own requirements.”</i>	People management	✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
	<i>“Various supplier contracts do provide incentives for supplier behaviours in particular project cases, with various standards centred on supplier management methods in such a way so as to influence project delivery.”</i> Project Manager specialising in healthcare projects	Incentive systems	✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓
			✓	✓	✓	✓	✓	✓	✓	✓

Chapter Five: Data analysis (semi-structured interviews)

	<p>“Most of the firm remains the business technology provider; there is some degree of coordination across production and development; however, there is a lack of end-to-end support functionality or post-implementation service for business customers.” KM Officer</p>	Clear goal and vision	✓	✓	✓	✓	✓	✓	✓	✓
Routinising organisational business activities	<p>“In-depth, wide-ranging approaches have to be determined bearing in mind documenting and preparing projects, such as comprehensive project briefs. These include deliverables, constraints, scope and objectives; but this needs such procedures to further encompass the definition of such issues as the methods of working, project roles, responsibilities, organisation and quality/progress/cost controls, plans and resources, sponsor responsibilities and assumptions (i.e. the 'how it will be done' of the project).” The Head of the Project Office</p>	Resourcing	✓	✓	✓	✓	✓	✓	✓	✓
	<p>“There is need for more consistent, planned approaches to community management related to IT projects. This is as a result of levels of dissatisfaction with the interoperability of technology, diversity of skills needed, variability of reliability and support. Technology reviews are performed sporadically/inconsistently in specific problem areas (e.g. PCs, development tools, communication devices).” The Director of IT Services</p>	Continuity management	✓	✓	✓	✓	✓	✓	✓	✓
	<p>“A number of continuous monitoring initiatives are needed to be implemented by organisations to bring adequate insight into underlying problems, with outsourcing agencies, suppliers and vendors.” Vice-president</p>	The alignment of the key organisational factors and the strategy of knowledge network	✓	✓	✓	✓	✓	✓	✓	✓
				✓	✓	✓	✓	✓	✓	✓

Chapter Five: Data analysis (semi-structured interviews)

	<i>“The need for IT to be well aligned with the organisation and to ensure a direction in establishing company-wide policies has been acknowledged; nonetheless, there remains a lack of understanding on the accountabilities and responsibilities that commonly complicate decision-making and development.”</i> Information Officer	Information management	✓	✓	✓	✓	✓	✓	✓	✓
	<i>“Throughout the course of projects, suppliers are intuitively managed, and are kept at a distance from the project itself and its management processes. Causes in this regard are manifold, and may include a lack of contracts, poorly defined contracts, inconsistency in the planning of a project, a lack of supplier relationship management to facilitate collaborative behaviours, and/or poor relationship development.”</i> Project Manager	Supplier communications	✓	✓	✓	✓	✓	✓	✓	✓
	<i>“There is a close integration between people, support tools and processes, with preventative actions implemented should there be any significant failure in projects.”</i> The Head of IT Services	People development	✓	✓	✓	✓	✓	✓	✓	✓
Legend: strong evidence - ✓✓✓, average evidence - ✓✓, weak evidence - ✓, no evidence – [blank]. The two consultants: (TC).										

The factors are explained as followed:

➤ Top management

Private sector project managers assert that organisations must embody, assess, translate, interpret and understand knowledge brokering activities as part of their strategy. The creation of a knowledge network, the level of commitment demonstrated towards its objectives, and the determination of its strategic orientation, depends upon the participation of top and senior management. The findings also indicated that IT project knowledge networks must achieve clarity in terms of objectives and goals whilst also involving network champions, network boundaries, network expansion, and periodic updating and development. Network activities are confirmed as being internal and external, with internal activities including network

management and governance, stakeholder engagement, the identification of project owners, routines and norms, the organisation's cultural and social attributes, communication activities, and collaboration

The findings stressed the role of top management in disseminating and utilising market knowledge as a key success factor in inter- and intra-organisational networks. However, the study findings revealed various practices with regard to top management commitment towards KN activities. Whilst international and local private companies support knowledge networking activities for value added reasons, government agencies lack such initiatives. There are a number of reasons why such differentiation exists. Private organisations consider KNs as a source of innovation and as a way of increasing their knowledge and experience, resulting in increased commercial profits. Conversely, the main aim of public agencies is to improve services and organisational performance and this has resulted in a failure to consider KNs as a strategic approach. Another reason that change management programmes are, to a certain extent, implemented in private organisations is that top managers can understand the value of such an approach. The public agencies face a lack of an appropriate KM infrastructure and also have poor IT infrastructures which are constraints to understanding the requirements and objectives of KNs.

➤ *Controls & audit*

This factor has been considered as significant in terms of knowledge networks of interpretation and translation. International companies utilise accumulated audit knowledge and experience by using industrial-based KM tools to provide engagement teams with sources of knowledge (i.e., industrial and process analysis, and industrial/technical information). Knowledge curve tools connect employees with a global intranet and key industries which increases their professional connections worldwide. Live Coaching systems are also utilised to increase information assurance. Private local companies have developed similar approaches to a certain extent as a result of engagement with international companies as strategic partners. Local organisations lack such an approach as a result of the lack of expertise.

➤ *Managing external changes*

The results showed that international companies adopt risk assessment programmes in line within their KM and ChM programmes in managing external change. Private local companies, to a certain extent, implement risk assessment programmes in their PMOs. Since public agencies rely on outsourcing agencies, the findings illustrated various views with regard to

considering this factor as a key in their KNs. Nonetheless, both international and private companies, and one public organisation, have implemented consultancy schemes to manage their external networks in order to anticipate and facilitate external changes. The strategic stakeholders' approach has been adopted by private companies to maximise their understanding of stakeholders' issues.

➤ *People management*

The findings indicated that people development supports their involvement in knowledge network activities through various means such as training, courses, seminars and international conferences. International and private local companies have a clear approach to assessing job descriptions and requirements in terms of understanding those areas where there is a need for developments. Although local organisations have invested heavily in people development, their business activities are vast so there is a need to adopt a KM strategy to increase organisational learning.

➤ *Incentive systems*

The results strongly agreed that this factor facilitates engagement in KNs. For example, various supplier contracts offer incentives in particular project cases regarding suppliers' involvement in KN networks. Another example, an incentive scheme for conference participation, was discussed in one of the case studies. In this case, specialists and experts were chosen to speak to employees and staff who then shared their knowledge from the conference with their colleagues. Employees were able to rate the incentives (like/dislike) on an internal website.

➤ *Clear goals and vision*

The findings also indicated that knowledge networks in IT projects must achieve clarity in terms of objectives and goals whilst also involving network champions, network boundaries, network expansion, and periodic updating and development. Every organisation has established its own vision to develop an integrated knowledge network to support its KM practices. The results asserted that KNs should be considered as a long-term strategic direction and various approaches were observed, including outsourcing strategies, business partnership strategies, and knowledge and expertise exchange agreements.

➤ *Resourcing*

The findings of the interviews confirmed the significance of determining in-depth, wide-ranging approaches regarding documentation. Documentation has been seen as a key in capacity planning by supporting the demands of multi-disciplinary IT project teams of analysts, designers, programmers, PM managers, PM teams and senior management while being assembled according to the project's needs in terms of resources, skills and experience. However, the findings revealed various practices in terms of resource assessments. For example, international and private local companies have invested heavily in KM approaches in line with PM strategies to advance formal mechanisms that are applied to establish and determine demands. In this regard, communication between the business and IT is ongoing, with the inclusion of an approach which is centred on reviewing and updating demand and priorities. The R&D was seen to define and assess the completion of periodic reviews for system-building tools and techniques, and for offering practical solutions to issues, as well as for assessing trends. However, investment in KM projects seems to vary across public agencies, as only one case was discovered which applied KM to resource allocation strategies (Organisation E). The other organisations have not yet realised the substantial benefits of networking their project resources with key activities and key people. The literature identified this factor as critical in having clear boundaries which provide a degree of separation from environmental influences; this facilitates tools and techniques for network planning, risk analysis, computerised resource allocation, and task coordination (Atkinson et al., 2006).

➤ *Continuity management*

The findings revealed several issues that were interconnected within continuity management. For example, defining multiple approaches for the planning and management of multiple IT projects are usually seen from a single pre-project phase, or from the point of view of monitoring and control. International and private local companies tend to follow systematic approaches regarding continuity management within their internal projects, whereas external projects lack commitment in the development of continuity in leading multiple projects. This was justified by the results as there was a lack of strategic planning and a corporate communication strategy between outsourcing agencies and public organisations. Public organisations lack an understanding of continuity management strategies in leading multiple IT projects due to inadequate outsourcing strategic planning policies and because of multiple changes into the roles of outsourcing agencies. It is evident that, if rapid and recurring changes occur in roles and responsibilities, or if there is a gap between strategies and demands, this will destroy any sense of continuity.

➤ *Information management*

The findings explained how organisations are different in their information management practices. Although information management was perceived as a critical factor, it is still an ongoing issue and challenge across the industry. While the international and private companies mostly applied KM (in their documentation and methods) to manage their information, public organisations either adopted similar methods or dedicated full-time resources and executive sponsors to cover all aspects of electronic data within their organisations. The lack of expertise in information management areas was observed to be a constraint impeding the application of KM approaches. The international companies and private local companies recruited the best qualified people; this was one of the reasons why a systematic definition of information management that covered most critical aspects was established for capturing quality data and managing improvement (i.e. means and metrics were established). However, public organisations have yet to launch such an initiative (i.e., learning from their strategic outsourcing agents) in trying to build an information society.

➤ *Supplier communications*

Suppliers or outsourcing agents were seen by public and private local organisations to be a fundamental factor in creating channels for consistent communication. In addition, international companies perceived this factor as an important route in creating long-term collaborations. The findings made a distinction between the long-term and short-term goals for supplier communications. While the former is a strategic collaboration for mobilising and leveraging supplier expertise regarding overall development, the latter primarily concerns specific development projects which have short-term goals in terms of supplier involvement.

➤ *People development*

The development of people skills was identified as a critical factor influencing the strategy of multiple IT projects. Most of the participants explained the relationship between skills and engagement in specific networks and fields. The higher the skills of individuals, the more potential they have to contribute to business network activities. The international and private companies used various means to develop their employees' skills, such as engagement in the experience exchange programme, attending international conferences, and linking their employees via technological means with external experts. However, public organisations tend to focus more on training and short academic courses, with little engagement with external experts. This is because public organisations depend heavily on outsourcing agents. The best method which was identified related to PM. This was something called "Experience-oriented

statements or programmes”; these have been used by international companies to maintain skills in line with providing support for project work. In this method, skills alignment is performed on staff who are chosen either to bid for or work on projects and services; this ensures the suitable utilisation of skills.

5.6.3.3 Factors influencing knowledge channels

The results of this study explained the critical role played by knowledge brokering in large IT projects. This is because many IT projects are outsourced and a wide variety of parties and resources are involved in the change strategies, processes and phases. Factors influencing knowledge channels are described in Table 5.6 in response to the frequency measures explained in Table 5.3.

Table 5.6: Empirical evidence regarding factors influencing knowledge channels

First-order code	Factors	Support from cases for organisational factors							
		A	B	C	D	E	F	G	TC
“We hear about the term knowledge networks, but what we have are not knowledge networks, they are business networks defined by job roles. Knowledge networks are not explicitly defined in order to be efficient. The main barrier is the misconception between knowledge networks and business networks.” Business Analyst	Knowledge network externalities	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
“The big issue we face in public organisations is the delegation and communication of decisions. We lack understanding of advanced decision-making practices. Most departments rely on top management decisions, rather than taking part in the process.” Project Manager	Communication management	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
“Our consultancy team takes parts in numerous IT projects and related developments, they link individuals with decision makers, link issues and solutions and bring more understanding.” KM Officer	Knowledge intermediaries and brokering	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
“I think knowledge networks are not organised enough to support information and expertise exchange; for instance, every organisation has its own alliances, vendors and partners which are not shared with other organisations, even if they work in the same industry.” Head of the KM Office	Knowledge networks’ structure	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
Legend: strong evidence - ✓✓✓, average evidence - ✓✓, weak evidence - ✓, no evidence – [blank]. The two consultants: (TC).									

Given that a large number of large-scale IT system projects are outsourced to external companies, resulting in the participation of various resources and actors in the numerous change stages and processes, the findings emphasise the crucial influence of knowledge brokering in this type of project. If the organisational challenges that occur during change are to be successfully addressed, it is crucial that knowledge networks are effectively defined. Defining knowledge networks alongside their components is vital, not only to solve organisational issues during the changes, but also to connect a variety of parties, including external experts, change agents, stakeholders, resources, key players and key activities. It is not

possible to carry out a project fully unless links between various actors are identified, proper networks are established, and project maps are created for key activities, resources and individuals.

5.6.3.4 Knowledge management infrastructure factors

The results of this study explained the critical role played by the knowledge infrastructure, including knowledge management strategies, processes, tools (e.g. IT communication systems), and the knowledge base; these contribute to shaping the strategic knowledge channels. Having a solid knowledge of infrastructure, alongside the knowledge base, allows companies to have standardisation in IT project advertising, marketing, innovation, implementation, and evaluation.

The participants stated that time was wasted if decisions were made without recognising strong performance levels and the most appropriate communication features. Therefore, the effectiveness of change management relies upon the acquisition of knowledge that facilitates decision making in terms of the selection of effective change strategies; these can be achieved by defining change boundaries, integrating internal and external resources, putting objectives into place, and reducing limitations and restrictions. Procedural knowledge is believed to be strengthened through the knowledge management infrastructure, thereby supporting decision making through “lessons learnt”. One recommendation, as highlighted by an interviewee, is to establish a knowledge map system and put in place a living documentation system that brings users, stakeholders, vendors, project managers and relevant specialists together. Such a system is used in Company A to facilitate decision making. This is connected to a knowledge base in order to guide other projects that are implemented in the future and is thought to greatly support decision making through knowledge mobilisation.

Factors influencing the KM infrastructure are described in Table 5.7 in response to the frequency measures explained in Table 5.3.

Table 5.7: Empirical evidence for factors influencing KM infrastructure

First-order code	Factors	Support from cases for organisational factors							
		A	B	C	D	E	F	G	TC
“Data quality should be assessed in a proactive formal structured way against agreed quality targets. Key metrics should be identified through formal assessment of the organisation. This needs to be routinely measured and reported.” Total Quality Director	Resource allocation mechanisms	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
“Employees’ communications are to be encouraged through multiple approaches including team structures, a formal appraisal process and organised but informal social occasions which should be also attended by all levels of staff.” Knowledge Officer	Tools	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
“The success of all projects depends on human elements incorporating with enabling technology.” Head of the PM Office	KM systems and enabling technology	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
“An adequate budget has to be allocated and authorised and the required resources such as training courses, educational programmes and consultation have to be established. There is also a need for the newly introduced system to be compatible with the existing system and that the current infrastructure is ready to accommodate the new system.” IT Project Management Consultant	Authorities	✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓	✓	✓	✓
Legend: strong evidence - ✓✓✓, average evidence - ✓✓, weak evidence - ✓, no evidence – [blank]. The two consultants: (TC)									

5.6.3.5 Knowledge networks’ (KNs) initiation factors in IT projects

The results explained the necessity of capturing corporate knowledge across multiple IT projects. Therefore, KN initiation factors in IT projects are described in Table 5.8 in line with the frequency measures explained in Table 5.3.

Table 5.8: KN initiation factors in IT projects

First-order code	Factors	Support from cases for organisational factors							
		A	B	C	D	E	F	G	TC
<i>“There is an absence in terms of the government’s role in trying to control the vendors of IT products and services. What I mean here is we need public organisations to work as partners with private organisations rather than working as “vendors vs customers” or “suppliers vs clients”. More cooperation is needed to build a strategic and strong information-sharing economy.”</i> KM Officer	KNs as a strategic direction	✓	✓ ✓		✓ ✓	✓ ✓	✓ ✓	✓ ✓	✓ ✓
<i>“The business acknowledges the need to complete IT service delivery reviews across its individual units, with IT requirements needing to be reviewed by the various departments, and subsequently individually procured or otherwise given to the IT function on the corporate side. All of the business units are likely to establish and directly communicate their own requirements with IT.”</i> IT Consultant	KNs as a dynamic process	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
<i>“The enterprises are strongly aware of the need for knowledge management. Senior management should be visibly active promoting knowledge management and aware of the critical nature, relevance and impact. Strategies should be designed to achieve required cultural change so to be implemented through a formal project planning process.”</i> Business Analysis Director <i>“The success of cultural change should be tracked and measured on a phased basis. A formal knowledge map has to exist of the knowledge sources and presented in a manner consistent with a knowledge management framework.”</i> IT Officer	Implementing KNs within the overall strategy	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
<i>“Where appropriate, the knowledge map should be extended to outside the organisation, encompassing relevant external sources (e.g. with stakeholders and/or business partners). Search engine technology should be deployed across the knowledge base. Formal, consistent recognition by all appraisers of appraisee's knowledge contribution.”</i> Knowledge Officer	KN extension planning	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Legend: strong evidence - ✓✓✓, average evidence - ✓✓, weak evidence - ✓, no evidence – [blank]. The two consultants: (TC)									

Chapter Five: Data analysis (semi-structured interviews)

The creation of IT project networks, with regards to their structuring, management, implementation, extension, evaluation, planning and innovation, was discussed by the interviewees, with the results differing between sectors. The private sector (international and private local companies), for instance, demonstrated greater focus on financial outcomes and expenses. One of the international and private companies increased their practice of “knowledge mapping” to figure out who were the stakeholders, who were the knowledge holders, who were the project owners, who were the most effective people in decision making, what sources of knowledge could be accessed or needed identification, and what were the initial, middle and final concerns.

Whilst most firms do not often adopt this approach, this represents a relatively new focus in processing knowledge networks in order to ensure that relevant parties receive effective knowledge exchange. Conversely, the public sector (government organisations) relies upon the private sector to address various issues, such as the silo mentality (the public sector’s refusal to share knowledge with the community), the insufficient number of specialists, the lack of a knowledge base, low levels of relevant IT maturity, the absence of external networks and communities of practice, poor support from senior management, and a lack of availability in terms of knowledge sources. IT project experts specialising in knowledge management strongly believed in encouraging public sector organisations to spot suitable opportunities while the current economy of the country is strong in order to gain knowledge as much as possible and to try to implement such techniques, innovation and strategy into their needs. Otherwise, private companies will always take advantage of public organisations’ areas of weakness. It has been said that the lack of national project documentation has led to weak decision making, making unclear business cases, assessing IT project activities subjectively, and increasing outsourcing activities.

The findings indicated that such national projects must have KNs as a strategic direction. This should be a dynamic process, with KNs being implemented, together with KN extension planning, within the overall strategy.

5.7 Summary

This chapter discussed the results of the interviews across the international, local private companies and government organisations, in addition to the evaluation with two independent consultants (evaluated CMKNM 1 and 2). Factors were identified across the main themes included: organisational factors, KM infrastructure, KNs' environmental and critical factors, factors influencing knowledge channels, and KN initiation factors. The findings were obtained by employing thematic analysis and comparative analysis. This was done to highlight the similarities and differences in the emerging themes. Based on the empirical findings, the conceptual framework has evolved to the evaluated CMKNM 1 and 2. Following this, influential factors were explicitly identified to highlight their importance to the cases investigated. Next chapter will further explain the empirical findings by triangulating evidence from documentation.

Chapter Six Empirical findings enhanced by documentation analysis

6.1 Introduction

This chapter presents enhanced empirical findings by using data triangulation from documentation analysis. The same five main themes as identified in Chapter 5 are discussed. These are organisational factors, knowledge management infrastructure, knowledge network environmental and critical factors, factors influencing knowledge channels, and knowledge networks' initiation in IT projects. Figure 6.1 depicts the process of document analysis, including assessment of the themes that were identified, and how relevant review inputs are transformed into outputs.

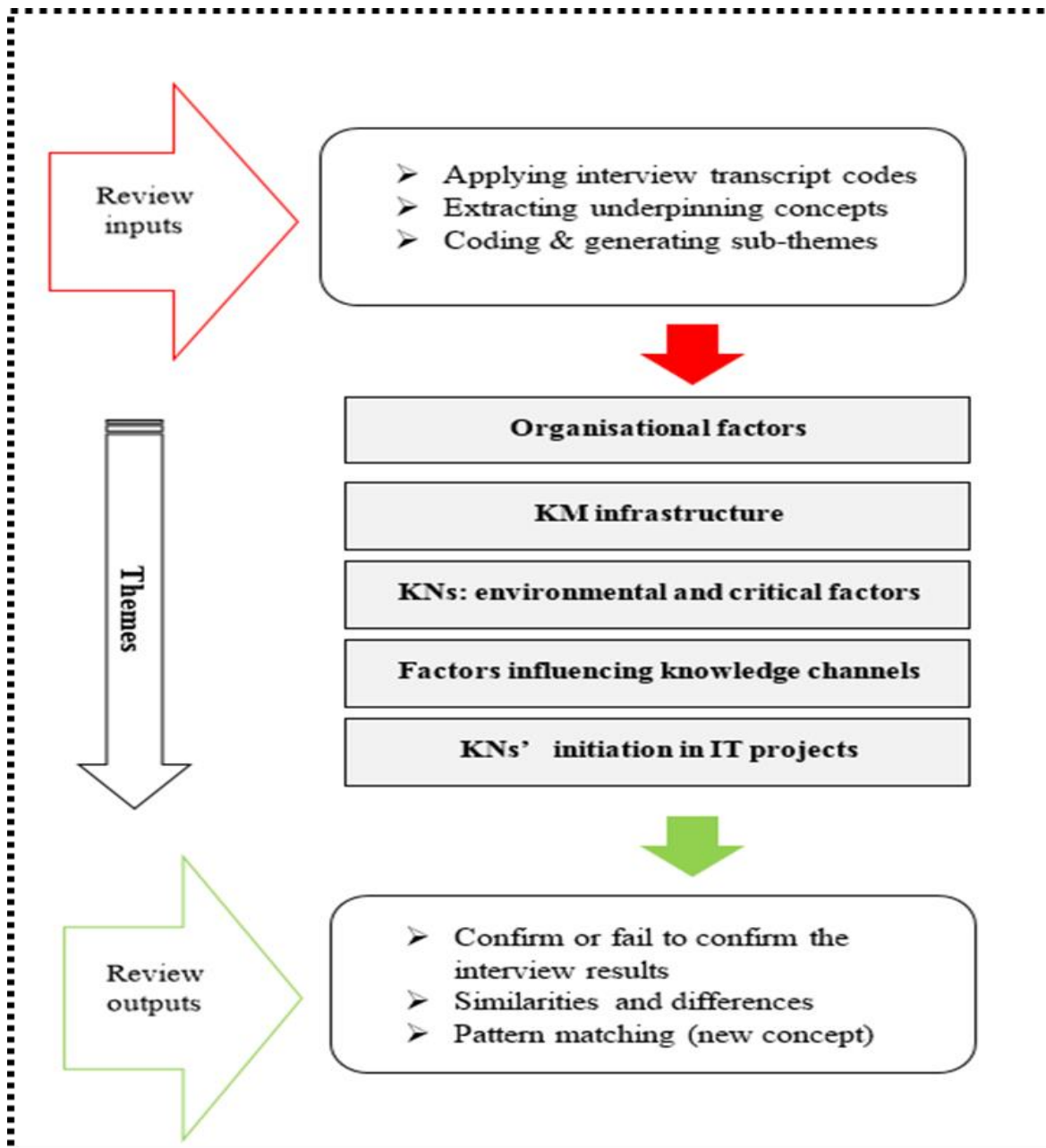


Figure 6.1: The assessment process for the identification of the themes and the outcomes

6.2 Organisational factors

The documentation results confirmed that there is a significant shift across the industry towards understanding organisational strategy and its related elements. In the IT industry in particular, the results indicated that there has always been acknowledgement and agreement concerning the projects, plans and priorities for fulfilling business needs, with IT being aware of the architecture and technical emphasis required to support plans and satisfy priorities. However, one of the most critical factors was found to relate to decision-making issues in terms of the

overall alignment with organisational strategy. One of the main areas that is commonly overlooked is the role of senior business management in ensuring that any key issues are addressed alongside the IT mission and role statement. This is because strategy, plans and objectives for IT will be affected by the mission statement. Importantly, the mission statement is seen as having a key role in the decision making of senior IT enterprise managers since it emphasises plans, objectives and strategy, and also has a significant impact on personal behaviour. Another issue relates to the alignment of IT with the business plan as this plan is often centred on the business knowledge possessed by IT management. Thus, there is a tendency for the IT plan to be very much focused on IT goals rather than on organisational ones. A further issue relates to the lack of long-term planning for IT projects even though they are fundamental and continuous. In this regard, a lack of consistency in long-term strategic planning and a lack of adherence to plans by IT seem to be commonplace. There is also lack of understanding of multiple IT projects across the industry which means that it is common for goals to be set at too high level by, for example, attempting to decrease IT spending, providing more ambitious services, and rationalising technology, etc. On the other hand, overlooking other related elements often causes projects to fail. It is recommended that the strategic plan should not be built on directions being taken by technology, or be driven by inputs from the IT strategy; business opportunities and needs should be the main inputs.

In terms of organisational cultural aspects, the current review results indicate that cultural change needs to be re-evaluated as knowledge is not shared and most of the access to knowledge and information is carried out on a trial and error basis. Another major issue relates to a lack of assessment and management of change; this is commonly not understood. It has been recommended that there is a need to establish cultural change if the management planning of multiple projects is to be facilitated. Considering cultural characteristics is seen as necessary to facilitate effective KM. This can be measured by examining cultural barriers and cultural elements of change management. Clearly defining such measures is believed to increase the success of the knowledge sharing which comes with trading partners. This is because new systems will change the working practices of most business units and departments, increasing the pressure on them, while others will feel that a new system is being imposed on them. This is one of the most common issues when involvement in decision-making processes is very limited since there is a general lack of awareness of the overall aim.

Organisational structure was identified as either contributing to the knowledge-sharing environment or discouraging key employees from engaging in decision-making processes. The results referred to an effective structure as the degree to which responsibilities and roles are communicated, as well as their overall alignment to the organisation and the degree to which they both enable strategy and further facilitate effective direction. The lack of a decision system to delegate initiatives caused several obstacles impeding the success of IT projects. Centralised decision making was seen as a barrier to effective PM. This made it challenging for the IT Department and senior managers to understand and hindered them from focussing on business priorities. The documents recommended that, for successful planning for multiple IT projects, there is a need to move to project-centred groups to facilitate effective practices in KM.

Assessing organisational capacity in order to plan, implement, evaluate and carry on managing multiple projects successfully seemed to lack a consistent approach. The documents revealed that most organisations tended to use a departmental approach for assessing organisational capacity, which could pose a challenge to overall organisational alignment. The document results highlighted some of the major issues that are facing organisations. These issues included: capacity management not being implemented within the organisational structure; and that most organisations lacked a clear programme and awareness. KM applications could be a solution with regard to capacity management in solving complex and intangible change. The results also shed light onto stakeholder issues during the selection of solutions and in terms of project assessment. This is because cultural differences among the stakeholders can influence their views in understanding the needs and meeting the requirements of a project. Thus, change management relies greatly upon an accurate definition of organisational capacity, as does the ability to recognise how much action is needed regarding a decision support process. Consequently, the readiness of the organisation and its staff should be properly evaluated. Uncertainty and a lack of clarity arise when decisions associated with the definition of change boundaries are hindered by the absence of systematic KM strategies.

6.3 KM infrastructure

There is overall awareness concerning the need to ensure that KM is clearly understood, particularly by information specialists and IT seniors; in this regard, there is a little active promotion of KM amongst senior management, with IT staff understanding its critical relevance, impact and nature. The design of strategies is encouraged to address the necessary

cultural changes via a formal project-planning process while the success of cultural change is monitored and measured, with a formal knowledge map being implemented regarding knowledge sources; this is presented in a way that is deemed consistent with a KM framework. Where necessary, the knowledge map is expanded to extend beyond the firm, and to include relevant external sources. The implementation of search engine technology is also encouraged across the knowledge base, with consistent acknowledgement on the part of knowledge contribution appraisers. The key findings with regard to the KM infrastructure are as follow:

- There are no clear processes to improve planning to allow more rapid growth and simpler incorporation of new acquisitions into the group structure.
- Processes are generally not systemised and not well defined, communicated or understood by external parties.
- The planning of the KM infrastructure is generally conducted at too high level; it is not coordinated across business units and divisions, or aligned to business strategies.
- There is a great number of non-strategic decisions that usually require senior level approval, and by business units and departments. These are commonly constrained by inflexible and unaccommodating support unit and department processes.
- Development initiatives are mainly internally focused, with limited business partnerships to learn from other practices.
- Various critical systems are out-dated or poorly supported, and supplier/vendor risk is not spread for key contractors.
- There is lack of central management and control units to provide direction and governance for the Shared Service Centre, receive new service requests, calculate and allocate costs, manage customer relationships, and resolve cross-unit issues.
- Internal organisation units and departments lack the power to obtain the knowledge they need from the Shared Service Centre to support greater understanding of operational issues.
- Business units need to be empowered to procure the services they consider necessary to support their operations from the Shared Service Centre. Business unit heads should be held accountable for the profitability and growth of their businesses; benefits and incentive schemes should reflect this.

In examining the key findings regarding the KM infrastructure obtained from the analysis of the documentation, key pattern matching can be observed in relation to the results of the interviews. For example, the results of the interviews drew attention to fundamental issues

concerning the knowledge infrastructure. These included: a lack of resource allocation mechanisms, KM infrastructure technology was commonly poorly defined, and there was a lack of supporting tools and authorities. These issues were compared to the results from the documentation analysis which shed light on similar critical issues, as mentioned above. Further examination of these patterns allowed additional concepts to be generated concerning institutional knowledge networks (IKNs), which further offered more understanding of IKN components. As suggested by Eisenhardt (1989) and Dong et al. (2009), additional concepts are generated during the pattern-matching process across the results; this brings a more sophisticated understanding of the area being studied. This coincides with the frequency of words occurring during the coding procedure in relation to the sub-themes and themes that were identified. As explained previously, the researcher applied the coding used with the interviews to the documentation analysis in order to search for potential emerging patterns, similarities and differences, and to confirm or disconfirm the findings of the interviews. Additionally, by considering the results of the interviews highlighted in Chapter Five regarding the fundamental issues centring around IKNs, together with key issues concerning the KM infrastructure, six components of IKNs were identified. These were: knowledge preservation, knowledge processing, knowledge production, knowledge allocation, knowledge utilisation, and knowledge authorising (see Figure 6.2). These IKN components gave greater understanding of and meaning to the underpinning related issues to encourage management to develop a consistent approach with regard to solving correlated issues.

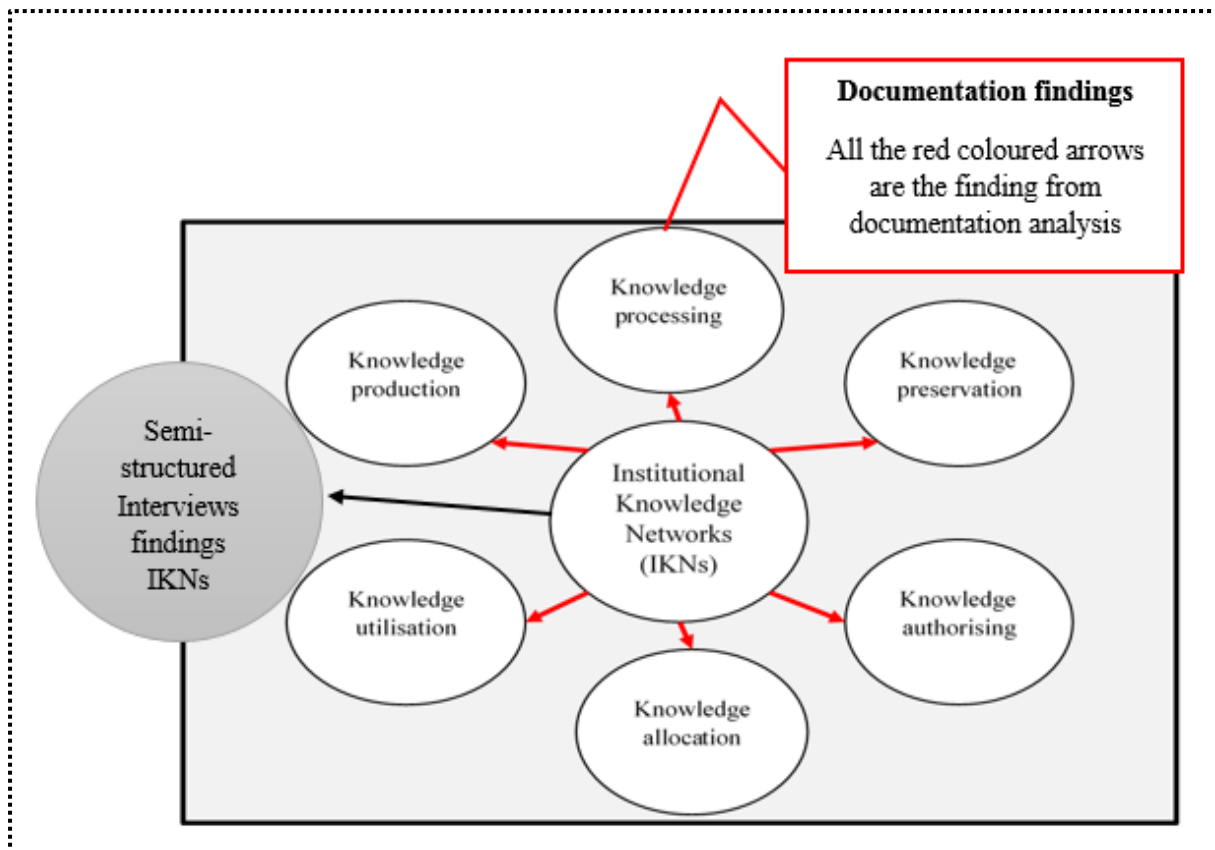


Figure 6.2: IKN components

6.4 KNs: environmental and critical factors

The documentation results confirmed that there was a great deal of awareness with regard to arranging knowledge activities alongside business activities in IT project initiation, planning, implementation and post implementation. However, this awareness did not preclude a number of challenges, including the need to have supporting tools in place to monitor service information and capacity, as well to govern external and internal parties. Another challenge related to the need for KM systems to reduce dependence on individual knowledge, by documenting critical processes and information. The results confirmed that a KM system needs to be able to support a holding company structure, and to allow further strategic planning to be integrated. KM should also be considered as a fundamental approach to an IT project's strategy. This needs to be prepared and agreed, and should set out how IT will improve internal functions and increasingly focus on business needs. This needs to be supported by an overall enterprise architecture roadmap, setting out how all of the technologies implemented by IT will fit together, and how data from different businesses will be managed.

The results also explained how demand and portfolio management processes need to be formalised in order to create a single channel for IT project (investment) demand while allowing the objective prioritisation of different business needs. Projects need to be delivered through a formal, mandatory project-management lifecycle with mandatory business cases agreed with the institution before any design work begins. Furthermore, the project's finances should be tracked and reported. The findings highlighted the role of business analysts who should be available to capture accurately business requirements and to ensure that contributions are received from all stakeholders. The finding confirmed the previously identified critical factors in KNs, including: top management commitment, controls and audit, managing external changes, people management, incentive systems, clear goals and vision, resourcing, continuity management, alignment of the key organisational factors and the strategy for the knowledge network, information management, supplier communications, and people development. The key findings with regard to the environmental and critical factors of KNs are as follow:

- There is a lack of business process documentation mapping
- There is a lack of explicit procedures for purchasing and negotiations while the process for the approval of IT projects is complex.
- A change management programme to manage external and internal change is lacking. While top management understand the future direction to some extent, senior and low level management lack such awareness.
- Issues regarding the delegation of decision are very common, and senior and low level management feel it would be highly advantageous if they were given more authority, and if departments worked together more efficiently.
- There is a lack of engagement by low level employees in improving business planning, business processes, IT, training and infrastructure.
- There is a strong shift towards KM to map organisational activities and strategies, with a significant shift towards the management of communication among third parties.
- A great number of overlapping issues exist regarding the availability of assessed information and conflicting information in different systems; these frequently cause poor decisions to be made.
- There is a lack of an effective reward system with regard to knowledge sharing where errors and mistakes are shared; this means that others cannot learn from mistakes.

However, in examining the key findings across both the documentation and interview results, another pattern was observed. For example, the interview results revealed that, in terms of

knowledge networks of interpretation and translation (KNITs), major issues are rooted in knowledge evaluation, conceptualisation, customisation, codification and the simplification of knowledge to solve problems and support decision making (see chapter 5). The documentation results further supported this idea by highlighting the substantial portion of debate which centred around the issues of documentation mapping, explicit procedures for purchasing and negotiation, decision delegation authorities, and using KM to map organisational activities and strategies. There were also overlapping issues regarding the availability of assessed information and conflicting information in different systems which frequently caused poor decisions to be made. Additional understanding was gained by making into sets the KNIT components that were identified. This was achieved by applying the coding used in the interviews transcripts to the documentation. The results indicated that KNIT consisted of a set of components that included: codifying knowledge, customising knowledge, knowledge evaluation, simplifying knowledge, adopting knowledge, mapping knowledge, conceptualising knowledge and specifying knowledge. Most of the documents contained phrases such as “the information is complicated,” “there is too much information,” “reports are poorly written,” “information is invalid,” “there is no cohesion, no documentation mapping.” These phrases occurred frequently across several documents, and linking them to what was found from the interview results led to the development of second concept of “KNIT” components (see Figure 6.3). This provided an additional systematic approach to support the issues regarding knowledge networks’ interpretations and translations to support decision making in IT projects.

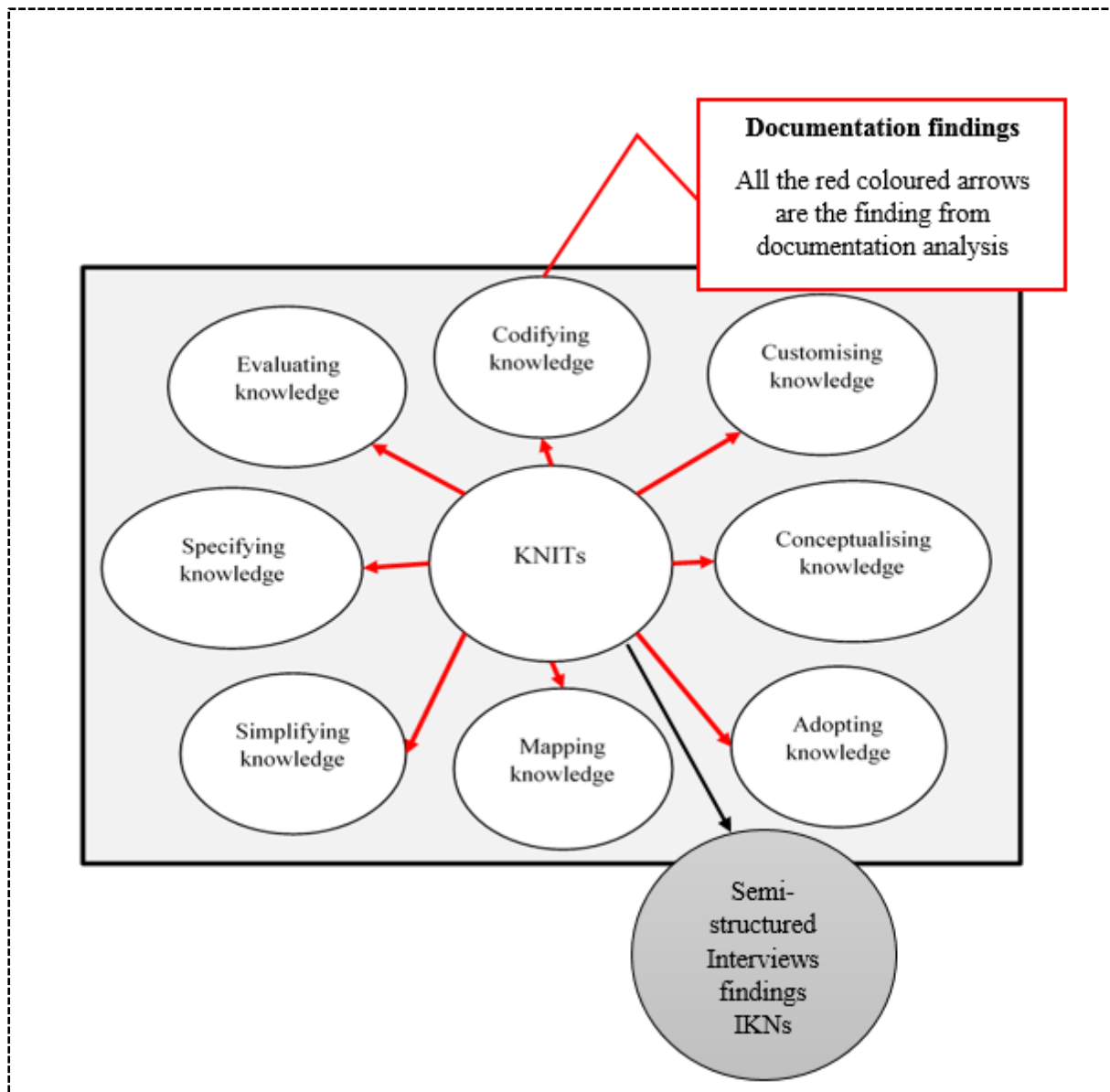


Figure 6.3: KNIT components

6.5 Factors influencing knowledge channels

The documentation results confirmed the findings of the interviews regarding the significant shift among organisations towards outsourcing IT projects, coupled with increases in knowledge brokering and intermediary practices. Overall, the strategy of organisations has been to implement business partnerships and outsourcing agencies into their strategic direction. This has occurred as a result of the high number of project failures, delays or failure to meet some of the projects' objectives. Knowledge brokering intermediaries are believed to increase the understanding of tangible and intangible IT PM issues, to connect several parties together, to raise awareness of knowledge documentation and practices, and to help organisations'

decision-making processes. However, the results suggested that there was a lack of clearly outlined processes and approaches concerning outsourcing management, with the existence of a number of different methods of IT management; differing ways in which staff dealt with customers; various trading partners, suppliers and users; all functioning in an uncoordinated and inconsistent manner. It was also acknowledged that there needs to be a more formalised method of outsourcing management, with central records being maintained with regard to service-level agreements with customers, suppliers and trading partners. A number of IT management and business analysts are already assigned to functional areas with a view to developing business understanding and relationships. However, there is a lack of measurement and monitoring methods regarding the success of such relationships. Third-party service providers and service delivery processes are mostly informal; a signed, pro-forma contract is used, comprising standardised vendor terms and conditions, along with service descriptions. Various aspects of service ownership lack clarity, meaning that disagreements can arise in terms of who is responsible for resolving issues. Moreover, although reports are available, these are not aligned to business objectives.

The knowledge brokering strategy has been seen as compensating for the lack of expertise in various business, PM and IT areas, and as replacing a culture based on informal practices and individual efforts. The key findings in terms of factors influencing knowledge channels are as follow:

- There is a lack of strategic planning towards outsourcing agencies.
- There is a failure to adopt a comprehensive change management strategy.
- There is a lack of collaboration among various parties involved in IT projects.
- There is little awareness of knowledge networks so most external communication is non-strategic (and is either too formal or too informal).
- National PM initiatives to classify vendors and suppliers, manage stakeholder issues and introduce explicit policies in such PM practices are lacking.
- There is a lack of expertise in KM and PM, and in some of the business areas among public agencies.
- There is a lack of R&D to establish an agenda regarding KM and PM issues in terms of reviewing failures and successes in order to benefit from “lessons learnt”. Instead, business recommendations are made on a technical basis.

- Businesses monitor analysts and/or competitors further examine emerging technologies when other business competitors are seen to be adopting, exploring or otherwise gaining value from technologies.
- There is a lack of a formal approach for researching the most efficient system-building environment. Ad-hoc tools and techniques are implemented sporadically, mainly in response to the experiences of individual IT managers.
- There is a lack of clearly outlined processes and approaches concerning outsourcing agencies and vendors.
- The capture of decision issues is not facilitated by, for example, the use of a formalised procedure or mechanism.

Nonetheless, in examining the key findings across the documentation and interview results, one more pattern was observed. For example, the interview results revealed that the major issues regarding knowledge networks of interaction (KNIs) were rooted under communication strategy, collaboration and a poor understanding of the role of knowledge brokering and intermediaries (see chapter 5). The key findings from the documentation analysis centred on issues regarding strategic planning on outsourcing agencies and related issues. To gain a deeper understanding, KNI components were identified by applying the coding used for the interview transcripts to the documentation analysis. These results gave greater insights into the nature of KNIs in terms of demanding knowledge, searching for and observing specific knowledge, identifying knowledge sources, assessing knowledge, understanding and negotiating knowledge, obtaining knowledge, collaborating and communicating knowledge, and connecting knowledge (see Figure 6.4). A slight difference between the interview and documentation results was observed regarding the role of knowledge brokering and intermediaries. The interview results indicated that knowledge brokering and intermediaries were actors throughout all the phases of knowledge channels, but that their major roles centred on knowledge networks of interaction, and the interpretation and translation of knowledge networks (chapter 5). Nonetheless, the documentation analysis results offered further understanding of knowledge brokering and intermediaries which was then classified as two types: external and internal knowledge brokering and intermediaries. Strategies regarding external knowledge brokering and intermediaries were employed most commonly by searching for and understanding specific knowledge, while the internal type was more related to knowledge networks of influence. This is further explained in the next section.

However, the reason why such slight differences were found could be related to the nature of IT projects and the outsourcing strategies of an organisation. This is because some of the organisations implemented outsourcing strategies for specific IT project activities while others managed their IT projects internally. Another reason could relate to variations among international, private and local organisations in IT project management practices. This is why this research considers all the identified themes to be interrelated; they cannot be viewed as separate.

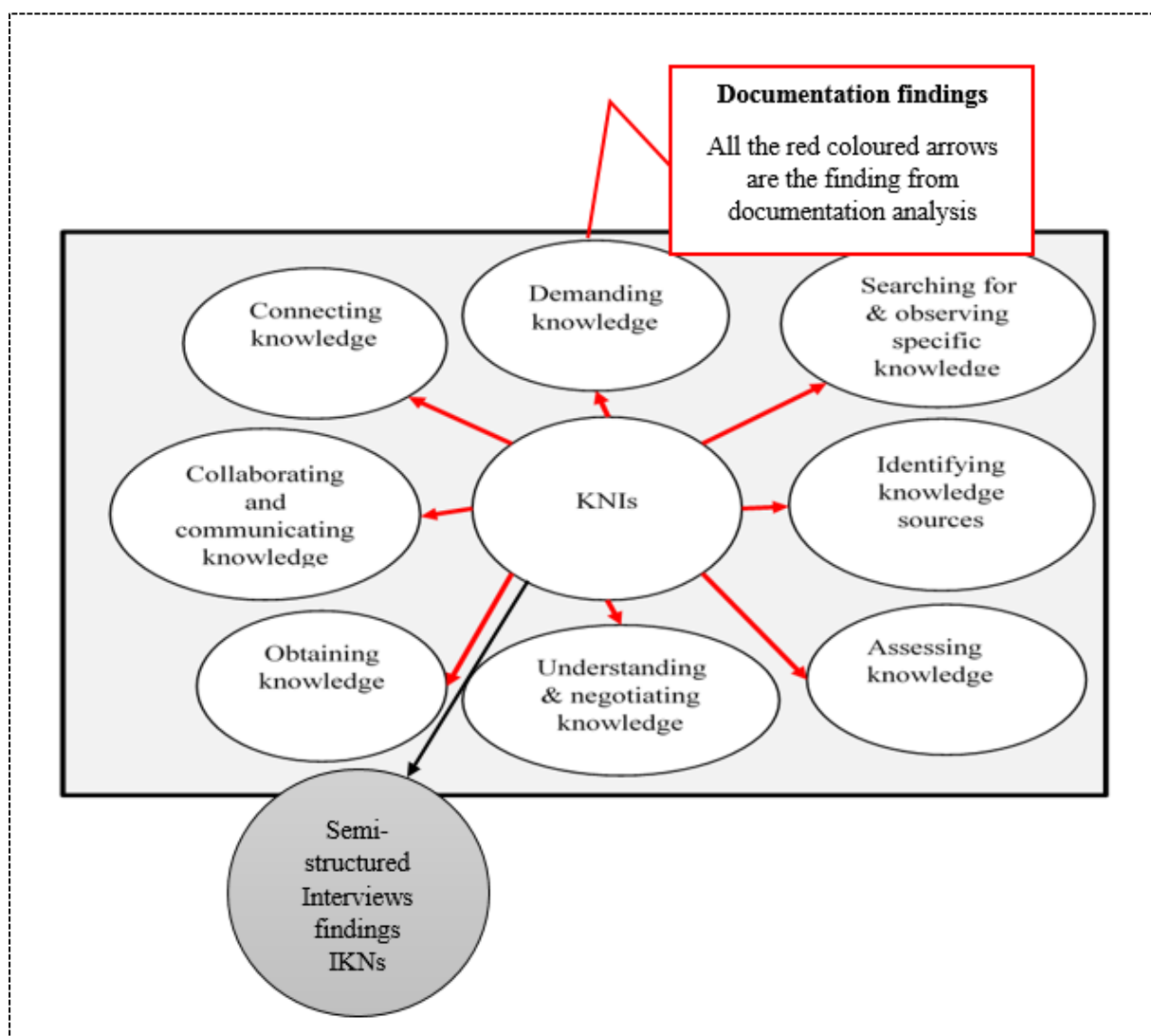


Figure 6.4: KNI components

6.6 KN initiation in IT projects

The results revealed that most projects undergo a formal project initiation stage, with project plans being created by working backwards from the outcome and outputs required to the inputs needed to achieve these. Project management software is applied by Project Managers while outcomes are reviewed through time-monitoring activities; this is also carried out to refine estimating models. Deliverables are broken down into lower level products, with a formal delivery process being applied in an effort to establish a breakdown of the overall product. Effort and timescale predictions are made in line with various estimating models of relevance; these include the most appropriate delivery metrics from within the firm. These metrics are recognised as reliable: i.e., few projects diverge materially on delivery from the agreed final estimate. Plans are refined in line with the capabilities of the actual resources assigned for the work, and include recognition of a 'planning horizon': i.e., plans produced near the end of the project that are more detailed than those produced for the long term; these are reviewed at pre-defined stages. Both costs and risks are identified, with analysis and planning taking place in these areas.

However, the initiation of KNs in IT projects is the most challenging task and the results revealed the following challenges:

- There is a lack of structure across milestones and a lack of support for the early identification of delays.
- Tasks are undertaken by different people, with the size of tasks varying from one to the next; individual experience plays a fundamental role.
- Risk assessment is subjective, resulting in details being missed in descriptions of the problems and opportunities faced in meeting business goals and objectives, in issue and solution statements, in cases of different scenarios, and in a project's constraints.
- There is a lack of a formalised approach with regard to the identification of the risks and issues in a project, and any corresponding evaluation is mostly intuitive. Project recovery and redirection processes are commonly not formalised or understood.
- There is little monitoring of work efforts although this is only available on a headcount basis. Knowledge of where work effort is invested does not follow a consistent framework, and plans are not baselined.
- There is a lack of a change management programme whereby changes are made on a regular basis; this may lack credibility.

- Project goals are mostly not shared with lower organisational levels.
- Data are often inadequate or inaccurate as a result of poorly defined documentation or a poor KM infrastructure.
- There is lack of planning towards project requirements in terms of the skills needed and staffing requirements.
- The focus of KNs is mainly on identifying financial estimates and the quality of the technology being introduced.
- The experiences of individuals are not extracted and shared, and there is a lack of consistent approaches towards the risk of people being shuffled in and out of projects.

The fourth observed pattern where components were identified is knowledge networks of influence (KNFs). For instance, the results of the interviews explained the relations between KNFs and the initiation of KNs in IT projects (see Section 5.8.1 & 5.8.3), with factors influencing the initiation of KNs in IT projects (see section 5.8.3) helping to deepen the understanding of specific knowledge and to communicate “lessons learnt”. The documentation results confirmed the findings and extended understanding of KNs’ initiation in IT projects by highlighting the challenges mentioned above. These challenges are mostly related to a lack of procedural knowledge, where knowledge is not enhanced to allow such knowledge to be turned into action in order to deliver the right knowledge to the right place at the right time. Another indication relates to the failure to consider KNs as a strategic direction and dynamic process. In this regard, KNs are not extended so the experience of individuals is not extracted and shared. There is a lack of a consistent approach concerning the risk of people being shuffled in and out of the project. Thus, by combining the results of the interviews and documentation analysis, further insights into emerging patterns of KNF components were gained. These components comprised six main activities: procedural knowledge, knowledge enhancement, communicating “lessons learnt”, raising understanding of specific knowledge, delivering the right knowledge to the right place at the right time, and turning knowledge into action (see Figure 6.5). The documentation results considered KNF components as internal activities derived from organisational knowledge, whereas the interview results viewed these components as internal and external organisational activities with more focus on the substantial roles played by knowledge brokering and intermediaries in bringing greater connectivity.

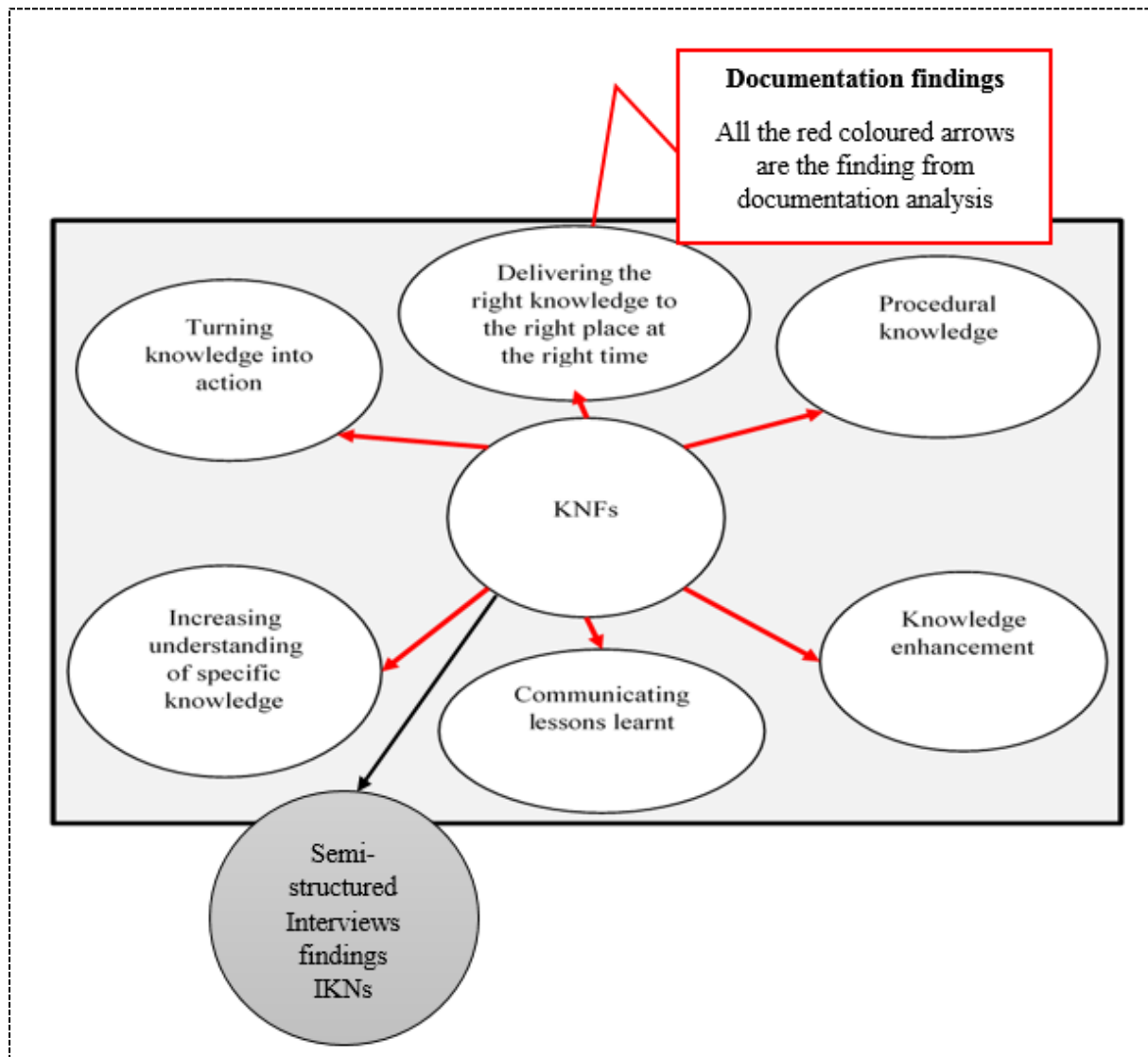


Figure 6.5: KNF components

6.7 Evaluating the framework of CMKNM

This section explains how the framework of CMKNM was evaluated, based on the empirical findings of from both semi-structured interviews and the documentation analysis, by refining and improving the conceptual framework. Figures 6.6, 6.7, 6.8 and 6.9 explain the building blocks used in evaluating the framework through the theoretical phase (the conceptual framework) and the empirical phase (evaluated CMKNM 1,2,3 and 4). These figures respectively demonstrate: establishing the concept of knowledge networks alongside their connections (conceptual framework); structuring knowledge networks across organisational boundaries in industrially-based IT projects (evaluated framework CMKNM 1); linking the

identified key factors to their related knowledge networks (evaluated framework CMKNM 2); defining knowledge network components (evaluated framework CMKNM 3); and presenting the final evaluated CMKNM framework (evaluated framework CMKNM 4). These sections were utilised to model the framework as follows:

- Items in CMKNM (conceptual framework) were employed to develop the establishment of KNs alongside their connections in order to align key knowledge mobilisation factors: organisational strategy, culture, capacity and the KM infrastructure. This is to mobilise knowledge and connect procedural knowledge to “lesson learnt”.
- The evaluated framework (CMKNM 1) shows the elements that were employed to evaluate the nature and structure of knowledge networks in industrially-based IT projects. See Figure 6.6 for the comparison between the conceptual framework and evaluated framework (CMKNM 2).

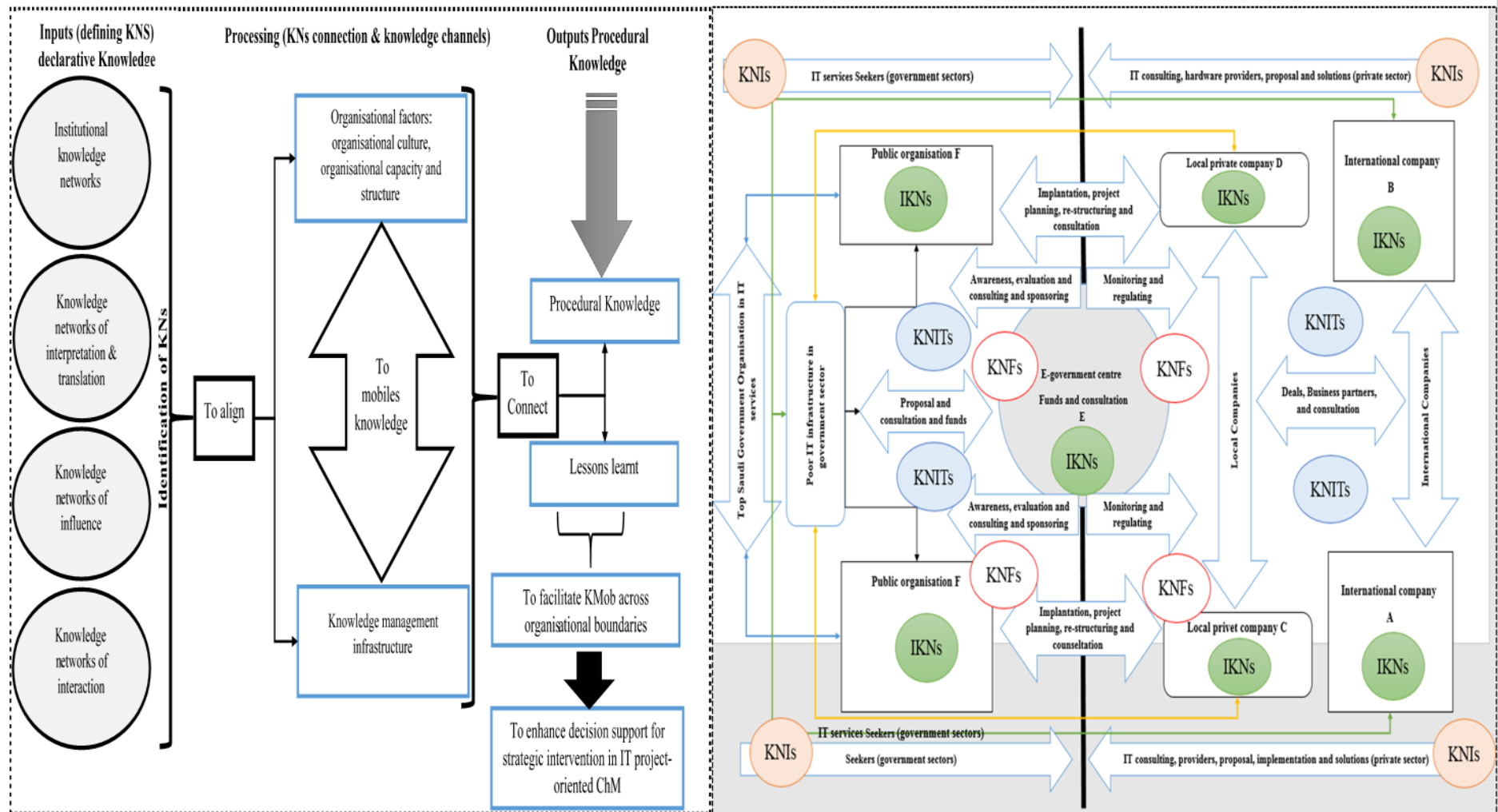


Figure 6.6: The conceptual framework CMKNM vs KNs with organisations and knowledge channels (evaluated CMKNM 1).

Figure 6.6 was evaluated to support decision making by tackling three existing issues (see chapter 1): insufficient knowledge traceability based on the relationships between knowledge elements and key factors; lack of procedural knowledge to provide adequate policies to guide changes; and lack of “lessons learnt” documentation in knowledge bases. Furthermore, it was used to investigate issues surrounding knowledge mobilisation and knowledge networks. The results were taken from the empirical study on the key factors influencing knowledge mobilisation in IT project-oriented change management, knowledge networks and connections. The resulting from the evaluation allows key knowledge mobilisation factors to be aligned with each other; it also defines the connections between knowledge networks, allowing knowledge to be mobilised by tracing knowledge channels to support decision making (Alkhuraiji et al., 2014).

In comparison to the conceptual framework, the second development of the framework (evaluated CMKNM 1) was designed to structure knowledge networks across organisational boundaries in industrially-based IT projects. The development of a structured knowledge network framework in innovative and implementable Information Technology (IT) projects was intended to understand the nature of KNs and facilitate knowledge sharing and transfer in a multi-organisational context. The results identified organisational factors and their influence on knowledge channels and knowledge networks. The framework offers new insights into organisational strategy, organisational culture, organisational capacity, knowledge network externalities, knowledge network intermediaries, and the knowledge network infrastructure (Alkhuraiji et al., 2015).

Figure 6.7 illustrates the concepts employed to highlight the connections between the identified knowledge networks and their related influential factors (evaluated framework CMKNM 2, see Chapter Five, Section 5.6.1). This was done after constructing the structured knowledge networks across organisational boundaries (CMKNM 1). The evaluated CMKNM 1 facilitates understanding the roles of the companies through multiple knowledge channels across boundaries. However, the evaluated CMKNM 2 facilitates understanding the connection between the influential factors and their related KNs to mobilise knowledge across boundaries.

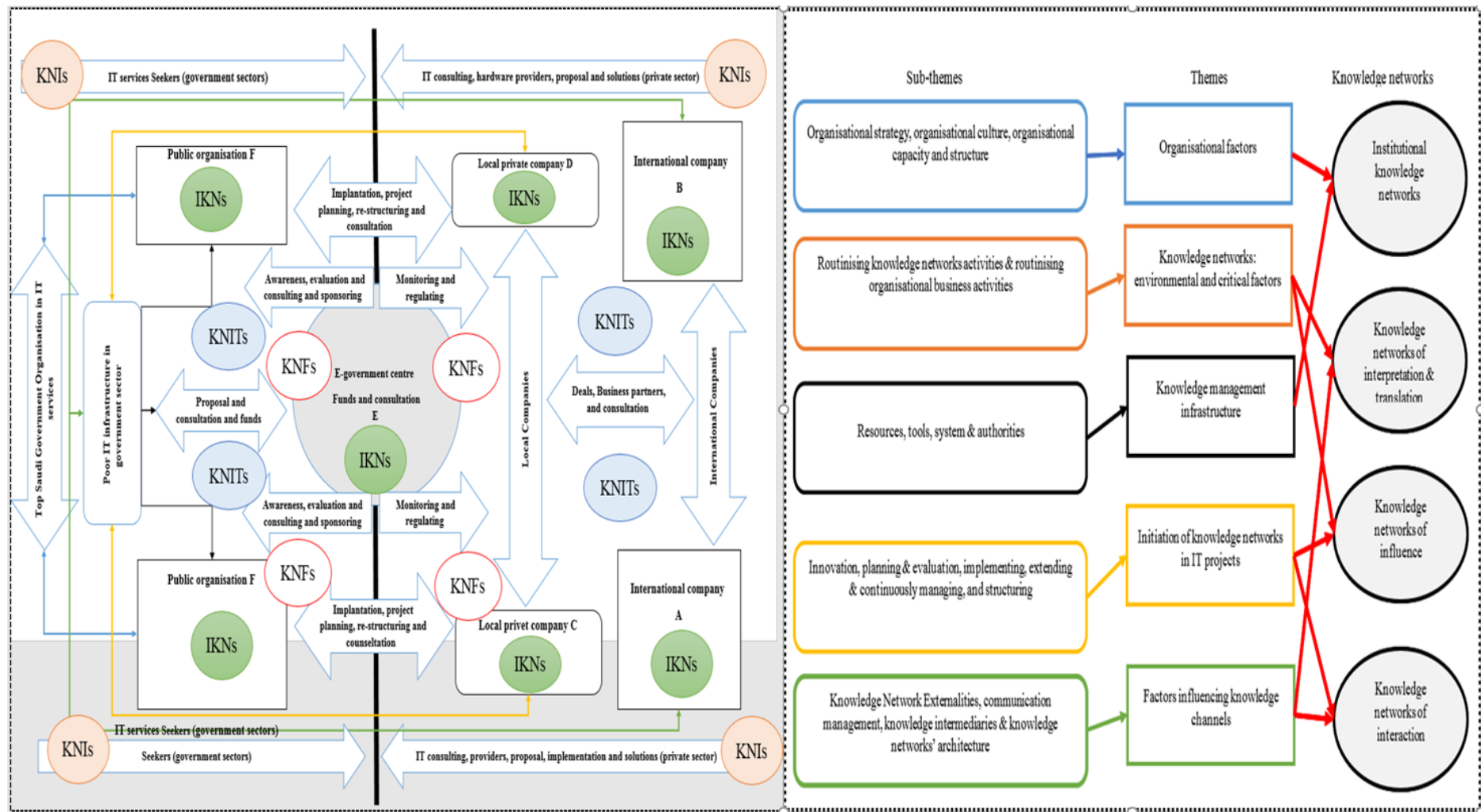


Figure 6.7: KNs with organisations (CMKNM 1) vs KNs and relates themes (CMKNM 2)

Items in the evaluated CMKNM 3 were found in the framework to define key elements of the knowledge networks. Moreover, further insights into KNs were obtained by applying the interview transcript codes to the documentation analysis; this revealed new concepts with regard to key components of KNs. This was explained in detail earlier in this chapter (documentation findings see Figures 6.2, 6.3, 6.4 and 6.5). The evaluated CMKNM 3 is a combination of these key components (see Figure 6.8).

In comparison CMKNM 2, the KN components were not identified and connected to their KNs whilst KNs are connected to the themes and their subs (Figure 6.8). For further details, see Chapters Five and Six.

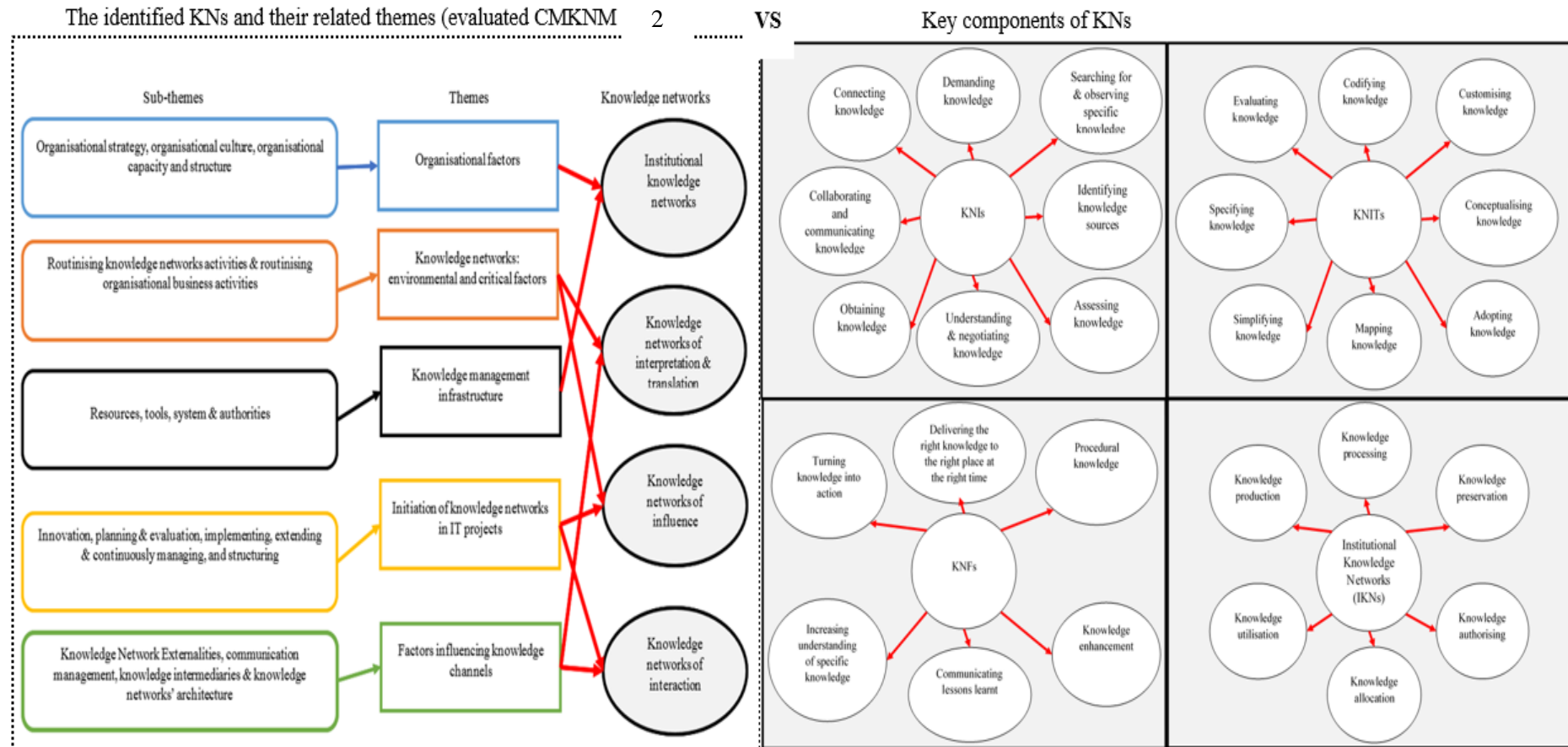


Figure 6.8: KNs and relates themes 2 vs KN components 3.

Figure 6.9 shows how KN components were employed and connected to their KNs. In the evaluated framework CMKNM 3, KN components were identified from the documentation analysis. However, in the evaluated framework CMKNM 4, the KNs components were connected to their relevant KNs, and connected to each other to facilitate the process of connecting declarative knowledge to procedural knowledge to enhance “lessons learnt”.

After conducting an in-depth review of the literature, and consulting again the results from both interviews and documentation analysis, the CMKNM framework was modified, as can be seen in Figure 6.9 (the evaluated framework CMKNM 4). As explained in Chapter Five (Section 5.6.1), the connections between the KNs and their related factors provide a consistent approach with regard to facilitating knowledge mobilisation and knowledge sharing across organisational boundaries. The key components of KNs provide insights into how each type of KN can interact to facilitate the process of knowledge traceability and connect procedural knowledge to “lessons learnt” (as explained in this chapter earlier). This substantially enhances support for decision making in strategic interventions in IT project-oriented change management.

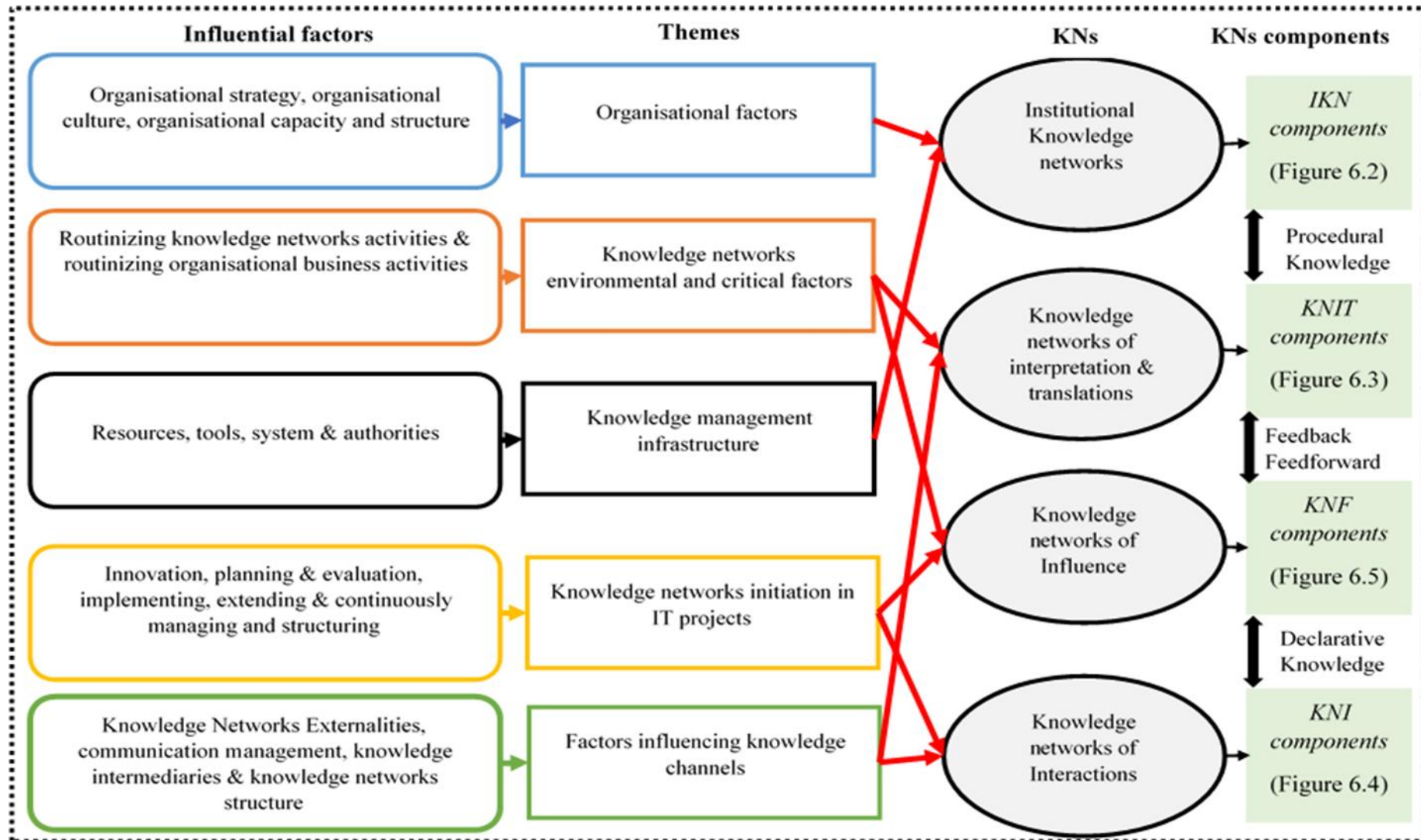


Figure 6.9: Evaluated CMKNM 4

6.8 Summary

This chapter discussed the documentation results from the second phase of the qualitative data analysis. The thematic and comparative analysis method was employed to the documentation. The similarities and differences between the documentation findings and the interview results were then highlighted. Pattern matching was undertaken and newly emerging concepts with regard to KN components were discussed. The KN components were further investigated across the knowledge network types, alongside the key issues found in the documentation results. The underpinning issues of the identified themes were explained throughout the identification of key findings under the themes of organisational factors, KM infrastructure, environmental and critical factors of KNs, factors influencing knowledge channels, and the initiation of KNs in IT projects. Based on the empirical findings, the final evaluated framework CMKNM 4 was presented. The process of accumulative development was demonstrated, beginning with the conceptual framework, and then moving through KNs' structure in industrial-based IT projects, the connections between the identified KNs and their related influential factors, defining key components of KNs, and eventually finalising the CMKNM framework. The CMKNM framework was constructed to facilitate knowledge mobilisation and knowledge sharing across organisational boundaries by connecting KNs, and KN factors and components. Its aim is to provide a connection between procedural knowledge and "lessons learnt" to support decision making in IT project-oriented change management.

Chapter Seven Discussion

7.1 Introduction

This chapter discusses the empirical findings of the qualitative analysis from both interviews and documentation analysis. To further validate the findings of this study and to draw a final picture of the framework, some of the key participants were invited to comment and express their views on the results (Yin, 2003, pp. 33-39). Three participants agreed to take part: the two consultants (participants 33 and 34) and the Business Analysis Director (participant 3), as shown in Table 4.1. Phone calls were made with the two consultants owing to distance constraints while a physical meeting took place with participant 3. The participants' views were aligned with the research findings although some minor recommendations were proposed. For example, participant 3 suggested defining the knowledge network elements; this was achieved by uncovering key components of KNs during the course of the documentation analysis. The participant then agreed with the findings. The two consultants suggested linking the identified factors with their KN types so that any future metrics would be linked to appropriate KN resources, thus giving the work more weight. The literature review was also taken into account to give greater solidity to the findings. Although knowledge networks are important solutions for knowledge sharing and transfer, implemented KN models remain scarce among business organisations according to the findings of this study. Understanding the issues concerned with building a well-defined KN is still complex and subject to the business context. This research examines several issues that may arise when trying to establish well-defined KNs for strategic decision-making in innovative and implementable IT projects.

This chapter starts by presenting evolution of KNs and KMob across various research phases. Following this, KMob and KNs factors are discussed. Next, lessons learnt from the empirical cases is highlighted. Finally, a brief summary is given.

7.2 Evolution of KNs and KMob across various research phases

Through extensive variety of research conducted in the field of KM, various approaches have been utilised across organisations to aligning KM approaches with the functions and goals of the businesses. Firms guide their thoughtfulness regarding the sharing of knowledge through individual connections, instructive activities and training, and additionally learning dispersal (Bhatti et al., 2016; Wiig, 2000). KM approaches general focus is on four components, to be individuals, process, empowering innovation and technology, and culture (Rathi et al., 2016; Choi and Lee, 2002). The instruments and procedures for KM are related to attaining business value, which have been considered as only effective when accomplishing top to bottom comprehension of KM concept (Hislop, 2013; Birkinshaw & Sheehan, 2002). Similarly, the theory of change centres on offering a number of approaches for managing change whilst the selection of appropriate approaches is at the heart of an organisation's strategic decision making.

Since this research have made an attempt to make synergies between KM and ChM, the focus has been on the understanding of how KNs and KMob contribute to support decisions in IT project ChM. Previous research brought fundamental understanding in addressing interrelated issues and factors among ChM, KM, project management and IT project management (Svejvig & Andersen, 2015; Tranfield et al., 2003). Such studies concerned factors associated with knowledge creation and sharing to assess and contribute to an organisation's readiness for change (Taylor & Wright, 2004). ChM models and theories offers a great evaluation across communication issues during change projects, leadership, and employees' engagement and commitment (Makumbe, 2016). However, a number of work lacks empirical exploratory work which increases the knowledge of organisational ChM (Todnem, 2005).

Key shift in among KM, ChM and PM literature is towards focusing value creation rather than product creation, where attention to be paid over dealing with intellectual assets. This is to offer solutions to the on-going challenges caused by the lack of understanding of linking projects to business strategies, meeting business needs and benefiting the stakeholders involved (Williams & Samset, 2010). Some of the recent trends of PM cross various disciplines direct the attention towards the need of empirical investigation on issues of decision making in change process methods (Svejvig & Andersen, 2015; Huang et al., 2012; Thomas, 2012; Rehman & Khan, 2012; Shipton et al., 2012; Judge & Elenkov, 2005). This is because most ChM decision related issues in PM are related to dealing with uncertainty, complexity and the implicit ambiguity. This is in particular with regard to systematics and interrelatedness within project decisions

(Svejvig & Andersen, 2015; Williams & Samset, 2010). Though most of PM research sheds the light on knowledge sharing, rare attention was paid to investigating project portfolio from knowledge repository perspectives. In the same vain, PM literature is still lacking empirical research to examine organisational and operational issues derived from the knowledge management related fields (Burke, 2013). Though KM literature offers a large number of studies regarding IT projects, most of which are related to critical success factors (Sharma & Singh, 2015; Wong, 2005). Other were on knowledge management strategies and systems to support the implementation of IT projects (Hislop, 2013; Bingi et al., 1999).

Because of the reported poor success rate of IT projects and change programmes (see Chapter 1 and 2), this study has distinguished itself by brining further understanding on the nature of KNs and KMob to assess traceability and connect procedural knowledge to “lessons learnt”, Additionally, this research has further investigated the findings from knowledge mobilisation studies that implicitly highlight new knowledge component of “know who” (i.e. knowledge holders, key knowledge brokering, key knowledge players and main influential people in an organisation) in networking (Neal, 2015; Naidorf, 2014; Jashapara, 2011; Levesque & Works, 2010; Cooper & Levin, 2010; Cooper et al., 2009). Although most of the work on knowledge network and mobilisation was carried out through understanding knowledge sharing activities in health and educational industries (Cooper & Levin, 2010; Cooper et al., 2009), this research has adopted the already identified issues to explore them in empirical study focusing on business practice (see Chapter 2).

Considering the above mentioned in mind, four main issues were initially identified. These include: inadequate understanding of the importance of ChM strategies in IT projects; insufficient understanding about how such activities in KM strategies should be undertaken; KNs are not systematically structured so knowledge channels remain intangible; and poor practice of KM strategies and applications (see section 2.7). To explore these issues, the conceptual framework was developed (see Chapter 2). The SECI model was used to identify KNs across organisations, whilst utilising Actor Network theory to identify the roles of actors within KNs. Knowledge mobilisation theory was conducted to understand KMob issues through channels alongside the adoption of ChM and IT PM theories to identify and explore current interrelated issues within project decisions and complexities (Theoretical phase).

During the empirical phase, the conceptual framework was explored qualitatively by analysing the results of the semi-structure interviews (evaluated CMKNM 1&2), documentation

(evaluated CMKNM 3), and combining both results by using comparative analysis evaluated CMKNM 4). The evaluated framework 1 differs from the conceptual framework by three main points. Firstly, the evaluated framework of CMKNM 1 defines KNs industrial based by structuring knowledge network that includes the roles of the companies and the main knowledge channels within the knowledge network. The conceptual framework however identified the four types of KNs and did not bring practical understanding on their nature. Secondly, the CMKNM 1 brought understanding on the dynamic process of how knowledge is transferred and mobilised across organisations to enhance the sharing, acquisition and documentation of knowledge in order to provide “lessons learnt”. Nevertheless, the conceptual framework lacks empirical explanation into how knowledge is transferred and mobilised across organisations. Thirdly, the CMKNM 1 identified key knowledge mobilisation factors affecting knowledge networks and channels in IT projects, whereas these factors were unexplored in the conceptual framework (see Sections 2.7 & 7.2).

The CMKNM 2 was drawn from the results of conducting the case comparison (see Section 5.6). Its findings differ from the CMKNM 1 in two points. Firstly, by conducting the case comparisons a deeper understanding of the key factors was generated through exploring the underpinning issues (sub-factors). Secondly, such understanding allowed to link these factors to their related KN types and highlighting the interrelation between these factors and KN types. The CMKNM 3 was developed based on the documentation results. It differs from the CMKNM 2 by revealing new concepts with regard to key components of KNs. This was explained in detail earlier in this Chapter 6. The new emergent concept of KN components were further investigated across the knowledge network types by conducting comparative analysis between the semi-structured interviews and documentation results (CMKNM 4).

There are substantial differences between the conceptual framework and the evaluated frameworks of CMKNM based on the empirical findings from both semi-structured interviews and documentation analysis (see Table 7.1 and Figure 7.1). Table 7.1 explains the differences between the conceptual framework, evaluated framework (1 & 2) and the evaluated framework (3 & 4) of CMKNM. Five criteria are used for comparison, namely: inputs, procedure utilised, method used, findings and the outputs. The key differences are based around the identification of sub-factors of organisational factor (i.e. organisational structure); the identification of KNs environmental and critical factors, KNs initiations in IT projects factors and factors influencing knowledge channels; the interrelation between the identified factors to their type of KNs

alongside the interaction between KNs; defining KN components and how declarative knowledge transfer to procedural knowledge.

Table 7.1: The differences between the conceptual framework, evaluated framework (1 & 2) and the evaluated framework (3 & 4) of CMKNM

Criteria of comparison	Conceptual framework (Theoretical phase)	Evaluated framework 1&2 (semi-structured interviews findings)	Evaluated framework 3&4 Interviews & documentation results
Inputs	Extensive literature review on KM, ChM, IT, PM, KMob and KNs	Semi-structured interviews results and two independent reviewers	The codes identified from the interview transcripts were applied to the documentation in order to reveal similarities and differences and pattern matching in the core concepts
Procedure utilised	<ul style="list-style-type: none"> This research attempts to analyse KM, ChM and IT project management from a more integrated perspective Investigate the development of a change management knowledge network framework (CMKNM) 	<ul style="list-style-type: none"> Assign Organisations Develop interview template Conduct semi-structured interviews 	<ul style="list-style-type: none"> Setting criteria to select relevant documents Sorting out accessibility and confidentiality issues Collecting relevant documents Applying the interview transcripts' codes to search for potential emergent concepts.
Method used	<ul style="list-style-type: none"> Systematic literature review Key words search Tree relevance topic technique 	<ul style="list-style-type: none"> Data analysis: thematic and comparative analysis. Refining the conceptual framework and implementing further developments Validating the findings by independent specialists 	<ul style="list-style-type: none"> Applying the codes identified from the interviews results to the documentation comparative analysis between the interviews results and documentation refining and evaluating the CMKNM (4)
Findings	<ul style="list-style-type: none"> Insufficient knowledge traceability based on the relationships between knowledge elements and key factors Most decision issues in PM are related to dealing with uncertainty, complexity and the implicit ambiguity, particularly with regard to systematics and interrelatedness within project decisions 	<ul style="list-style-type: none"> Understanding the nature of KNs by defining four KNs types and developing a structured knowledge network framework that includes the roles of the companies and the main knowledge channels within the knowledge network A structured knowledge network framework is seen as a key to understanding the dynamic process of how knowledge is transferred and mobilised across organisations to enhance the sharing, acquisition and 	<ul style="list-style-type: none"> Confirm or fail to confirm the interview results Highlighting Similarities and differences Identifying pattern matching (new concept)

	<ul style="list-style-type: none"> • Lack of procedural knowledge to provide strategic direction for managing multiple IT projects • Lack of ‘lessons learnt’ documentation in knowledge bases 	<p>documentation of knowledge in order to provide lessons learnt</p> <ul style="list-style-type: none"> • Generating new meaning and develop a deeper understanding of the cases themselves by conducting the case comparisons • Highlighting Similarities and differences between the cases • Identifying new factors affecting knowledge networks in IT projects 	
Outputs	<ul style="list-style-type: none"> • Developing initial concept of KNs to mobiles knowledge across boundaries • To align the identified organisational factors and KM infrastructure • To connect procedural knowledge to “lessons learnt” to enhance decision making in IT project oriented ChM 	<ul style="list-style-type: none"> • Bringing further understanding on how knowledge networks are mobilised through organisations and knowledge channels • Identifying KNs environmental and critical factors • KNs initiations in IT projects factors • Factors influencing knowledge channels • Linking the identified themes to the previously established knowledge networks 	<ul style="list-style-type: none"> • New emergent concept of KN components • The KN components were further investigated across the knowledge network types • Key issues and the underpinning issues found in the documentation results were explained throughout the identification of key findings under the related themes • Recommendation were drawn accordingly see Chapter 8

Figure 7.1 illustrates how the final evaluated framework of CMKNM differs from the conceptual framework. In the conceptual framework, as can be seen in the figure, four KNs identified based on the classic SECI model alongside how these KNs align organisational factors and KM infrastructure. The new findings are outlined in red boxes, whereas blue boxes are the previously identified concepts. The red arrows explain the interrelation between the factors, KNs and KN components. The connection between KN components to explored how “lessons learnt” can be communicated by connecting declarative to procedural knowledge (See Figure 7.1).

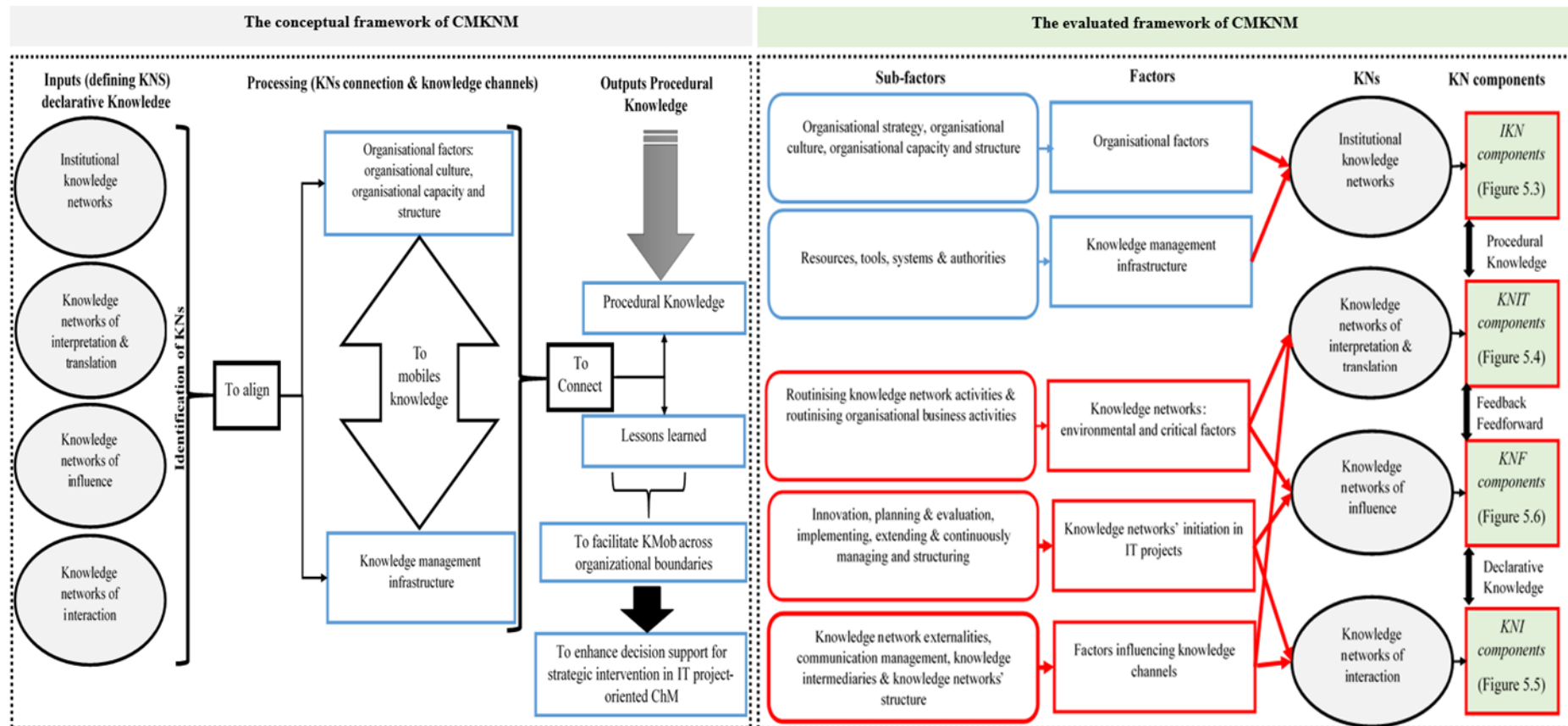


Figure 7.1: The conceptual framework vs the evaluated framework of CMKNM

7.3 Discussion on factors affecting KMob and KNs

This section presents the empirical findings of CMKNM which were identified in Chapters Four and Five. These can be grouped under key factors influencing knowledge mobilisation in IT project-oriented change management, and knowledge networks and connections (Alkhuraiji et al., 2015; Alkhuraiji et al., 2014). These two groups are explained in the following sections. The table below illustrates the empirical findings from the interviews and documentation in accordance to the literature. It highlights what factors are confirm/disconfirm by the literature, similarities and differences alongside the new identified factors influencing knowledge mobilisation and KNs in IT project ChM (Table 7.2). the next sections discuss these key factors and how the influence KMob alongside KNs and connections respectively.

Table 7.2: The empirical findings from the interviews and documentation in accordance with the literature

Factors	Result of analysis	Key findings relevant to the literature
Organisational factors	Confirmed	<ul style="list-style-type: none"> The study results indicate that organisational factors are critical to mobilise knowledge via the KNs during the course of ChM. This is in line with the literature which shows that the identified organisational factors are critical in IT projects during changes that influence decision making (Dayan et al., 2017; Bosch et al., 2016; Gareis, 2010; Gould & Powell, 2004; Syed-Ikhsan & Rowland, 2004; Themistocleous, 2002; Shang & Seddon, 2002).
KNs: environmental and critical factors	Confirmed and extended	<ul style="list-style-type: none"> Environmental and critical factors of KNs, including top management commitment, clear goals and vision, routinising knowledge network activities, the identification of knowledge networks, and incentive systems, should be aligned with the key organisational factors and the strategy of the knowledge network (Ahmad & Cuenca, 2013) It is particularly important to leverage knowledge distributed in the organisation's network (Sambamurthy & Subramani, 2005) and to have knowledge of facts, as well as to implement these facts in an organisation's business procedures, policies, products and innovation (Hu et al., 2016; Lomas, 2007). Learning is also an integral part of an innovative firms' core competency (Prahalad & Hamel, 1990). This study extended the above by grouping the factors into routinising KN activities (top management commitment, controls & audit, managing external changes, people management, incentive systems, clear goals and vision) in line with routinising organisational business activities (resourcing, continuity management, information management, supplier communications, people development, alignment of the key organisational factors and the strategy of the knowledge network (Alkhurairi et al., 2015; Alkhurairi et al., 2014; Ojo, 2013). Controls & audits, managing external changes, resourcing, continuity management, information management and supplier communications were added into the environmental and critical factors of KNs. KNIT elements were defined to increase the understanding of the key factors identified, particularly in relation to controls & audit, managing external changes, information management, and supplier communications, to communicate decision making.

Factors influencing knowledge channels	Confirmed and extended	<ul style="list-style-type: none"> • The results of this study highlighted the fundamental role played by knowledge brokering in large IT system projects. This is because many such projects are outsourced and so a wide variety of parties and resources are involved in the change strategies, processes and phases. • Previous studies in knowledge mobilisation in education have shed light on the role of knowledge intermediaries in educational sectors (Hu, Lin & Hsieh, 2016; Cooper, 2010; CHSRF, 2003; Ward et al., 2009b; Hossain & Shakir, 2001). This study suggested that knowledge intermediaries play a significant role in connecting knowledge networks to bridge the gap between external and internal resources and to connect knowledge networks of interaction (tacit knowledge) to knowledge networks of interpretation and translation, thus converting it into explicit knowledge (Hu et al., 2016; Alkhuraji, 2014). • As an additional factor to offer further understanding, KNI components were identified by applying the coding of the interview transcripts to the documentation analysis. The results revealed greater insight into the nature of KNIs, comprising: demanding knowledge, searching for & observing specific knowledge, identifying knowledge sources, assessing knowledge, understanding & negotiating knowledge, obtaining knowledge, collaborating and communicating knowledge, and connecting knowledge.
KM infrastructure factors	Confirmed and extended	<ul style="list-style-type: none"> • The findings of this study confirmed the need for an effective knowledge infrastructure across organisations to create a knowledge-based community to connect stakeholders, decision makers, IT vendors, users, project managers and organisational assets. To manage change in projects, the knowledge management infrastructure is a cornerstone which drives knowledge mobilisation as it combines IT project portfolios, defines knowledge management networks, and provides a selection of knowledge management strategies and appropriate knowledge-sharing tools (Pandey & Dutta, 2013). • This concept of a knowledge management infrastructure is driven by the notion of the IT infrastructure as a key in innovative technology (Hajir, 2015; Pandey & Dutta, 2013; Bose, 2003). • Further examination allowed additional concepts to be generated with regard to institutional knowledge networks (IKNs); this offered greater understanding of IKN components. • Six components of IKNs were identified (Figure 5.3).

KN initiation factors in IT projects	Confirmed and extended	<ul style="list-style-type: none"> • Previous studies, such as that of Hislop et al. (2000), have highlighted the need to identify knowledge networks in IT project intervention; some have attributed poor decision making in IT implementation to missing key details (Dalcher, D., 2014; Lutz et al., 2013; Yeo, 2002). Defining knowledge networks is vital, not only to solve organisational issues during the changes, but also to connect a variety of parties, including external experts, change agents, stakeholders, resources, key players and key activities. • The study findings reveal KNs as a strategic direction, KNs as a dynamic process and show the need to implement KNs within the overall strategy and prepare for KN extension planning. • The identified components of knowledge networks of influence (KNFs) facilitate improving the understanding of specific knowledge and communicating “lessons learnt” (see chapter 6).
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7.3.1 Key factors influencing KMob in IT project-oriented ChM

Owing to limitations in the literature surrounding KNs and knowledge mobilisation in IT project-oriented change management, as explained in Chapter Two, this research investigated the factors identified across related contexts (i.e. KM, ChM, PM and knowledge mobilisation see Table 7.2). The key factors influencing knowledge mobilisation are grouped into two types: organisational factors and KM infrastructure factors. These are discussed respectively in the next sub-sections.

7.3.1.1 Organisational factors

Scholars refer organisational knowledge as a strategic asset that should be implemented within business strategy (Bollinger & Smith, 2001). Implementing knowledge in line with an organisation’s strategic direction facilitates organisational learning; R&D; and knowledge creation, transfer and use (Dayan et al., 2017; Bollinger & Smith, 2001).

This study’s results also confirm the findings of Gareis (2010) in terms of treating ChM strategies as a set of processes and phases managed by projects and programmes, rather than managing changes within the IT intervention programmes or projects. The failure of IT system interventions can often be attributed to overlooking aspects of ChM and KM strategies to deal with all the phases of the intervention. All the participants agreed that:

“The failure of IT projects is often related to poor decision making in the pre-planning stages as many decision makers overlook change strategy in IT projects.”

Poor decision making in selecting appropriate ChM and KM strategies to manage change for IT projects, solve organisational issues, define business objectives (planning and vision), or to

draw too broad an image, will very likely lead to delay, discontinuity or failure. Overlooking the interactions between key activities and key players in selecting KM and ChM strategies to support decision making at all stages is a key factor in failure (Dayan et al., 2017; Alkhuraiji et al., 2014).

The study's results are also in line with those of previous work in terms of the relationship between cultural aspects and their influence on decision making (Dayan et al., 2017; Zheng et al., 2004; Syed-Ikhsan & Rowland, 2004). For example, cultural typologies and organisational maturity have to be considered as a foundation when making decisions about the selection of change strategies. In the context of change processes, silo mentality leads to poor transparency in decision making and is therefore perceived as a barrier. Transparency and trust should be nurtured through the creation of a community of practice that fosters collaboration between related organisations. This will ensure that IT projects are supported through a central knowledge community that improves procedural knowledge and relates it to "lessons learnt". The interviewees stated that it is necessary to collaborate with customers in order to identify the right kind of support system, and that the change process must be upheld through the establishment of an appropriate corporate culture. For example, in order to find solutions to internal political issues and determine who the most influential actors and important knowledge holders are, it is vital that seminars, conferences and training classes are provided. Furthermore, because knowledge holders are so crucial to decision support, reward and incentive schemes must be used, alongside other knowledge-sharing tools, in order to address interoperability problems. Effective KM strategy considers knowledge as strategic resource whereby highlighting the inter-relationship between KM and organizational strategy (Dayan et al., 2017).

The findings of this study are in line with previous research in that decision making is perceived in the context that innovation is embraced, depending on the technical, strategic, managerial, operational and organisational benefits it is believed to offer (Engert et al., 2016; Themistocleous, 2004; Shang & Seddon, 2002). ChM and KM rely greatly upon the accurate definition of organisational capacity, as does the ability to recognise how much action is needed regarding a decision support process. Consequently, the readiness of the organisation and its staff must be properly evaluated. Uncertainty and a lack of clarity arise when decisions associated with the definition of change boundaries are hindered by the absence of systematic knowledge management strategies.

The findings confirm those in the literature regarding how organisation processes influence information and communication. A well-defined organisational structure is seen to assess organisational culture; to identify stakeholders in IT projects; to create buy-in from those involved, ensuring cooperation and contribution; and to determine where the knowledge presently resides (Dayan et al., 2017; Reagans & McEvily, 2003; Bollinger & Smith, 2001). A good example was identified from the findings concerning organisations (see Chapter Five) where one practical solution that was implemented within the structure of the organisation was to create a Department of Corporate Communication. This Department's role was to connect various parties involved in a project and it was considered to be a key link between decision makers, stakeholders, key players, and key resources. This was believed to be a good solution for networking decision making with knowledge residing in the organisation. The organisation had implemented planning and projects within its structure, which comprised four interconnected units: total quality management, PMO, business process management, and an office of strategy management. This arrangement facilitated the maximum optimisation of knowledge sharing and responded to concerns about how knowledge could be communicated and used cooperatively across internal organisational boundaries. The findings confirmed those of previous studies in asserting the importance of the role of organisational factors in the leverage of knowledge. For instance, a poor organisational structure can indirectly inhibit the behaviour of individuals, discouraging them from sharing their knowledge across locations, divisions and functions (Dayan et al., 2017; Engert et al., 2016; Gold et al., 2001).

7.3.1.2 KM infrastructure factors

This research asserts that knowledge mobilisation is primarily supported and driven by the knowledge infrastructure, which is essential in facilitating project-oriented change management decision making. As per the work of Bose (2003), this approach to knowledge management infrastructures is based on the belief that an IT infrastructure plays a major role in innovation technology (Dayan et al., 2017).

The results of this research support the argument that, if a knowledge-based community is to be successfully established to bring together organisational resources, project managers, users, vendors, decision makers and stakeholders, it is necessary for the public sectors to implement a sound knowledge infrastructure. It is the knowledge management infrastructure's integration and provision of IT project portfolios, knowledge-sharing mechanisms, knowledge management strategies, and defined knowledge management networks that allow it to have such a major impact on knowledge mobilisation (Hajir, 2015).

Each of the participants involved in this study highlighted the severity of issues that arise in attempting to locate key information prior to change, with the information available often being insufficient, contradictory or too similar to other information, even in cases where the organisation has a great deal of technological experience. This study identified four factors that are key in establishing a solid KM infrastructure: resource allocation mechanisms, tools, KM systems, and enabling technology and authorities.

As with other studies, factors of the KM infrastructure which were identified were seen to be critical. For example, one of the strategies to implement an effective KM infrastructure is to establish governance functions for the top-down monitoring of systems and processes to allocate and promote knowledge-related activities. The role of management and leadership is concerned with the establishment of a KM infrastructure and the individual functions involved in the process of the creation, sharing and storage of knowledge. In addition, a KM infrastructure involves socio-technical systems which facilitate the process of aligning the social system and the IT infrastructure (Bollinger & Smith, 2001). Key factors of the KM infrastructure allow socio-technical issues to be solved in knowledge base, providing solid ground for “lessons learnt” so that the greatest advantages and needs of the organisation are met.

7.3.2 Knowledge networks and connections

This study defined KNs based on the classic SECI (socialisation, externalisation, combination and internalisation) to align the factors influencing knowledge mobilisation in IT project-oriented ChM; this alignment supports decision making (Alkhuraiji et al., 2014). The study’s results suggested the formation of four types of knowledge network across their related knowledge elements: knowledge networks of interaction, knowledge networks of interpretation and translation, knowledge networks of influence, and institutional knowledge networks (i.e. knowledge bases). Previous studies have called for the establishment of such KNs to facilitate knowledge channels and address issues regarding poor decision making in IT implementations. The existing literature demonstrates the importance of determining knowledge networks in IT project interventions, with certain researchers connecting ineffective IT implementation-based decision making with missing important details (Altamony et al., 2016; Lutz et al., 2013; Yeo, 2002; Hislop et al., 2000). a large number of the interviewees claim:

“Without drawing project maps of key people, resources and activities, building a proper network and finding connections between different parties, projects cannot proceed.”

Pervious research in KNs and KMob highlight the importance of understanding the issues involved in inter/intra-firms' relationship from intra-organisational learning processes to include inter-organisational angles (Del Giudice & Maggioni, 2014).

The evaluated framework of CMKNM allows decision makers to consider underpinning issues that could play a fundamental role in the planning of changes, thus contributing to the success of IT projects. The role of knowledge networks is to mobilise knowledge; to deliver effective knowledge to the right people in the right systems; to facilitate knowledge sharing, organisational learning and learning in real time; and to commoditise knowledge into a knowledge-base. Knowledge networks are driving forces in the analysis, evaluation, and eventually the delivery of the right knowledge to knowledge seekers; this enhances the consistency, quality and speed of decision making.

Information and knowledge brokering is a crucial topic receiving much focus in the drive to improve the effectiveness of IT projects. The participants noted that this has a major impact on ensuring that vendors and public sectors are brought together; it also facilitates carrying out studies to enhance the quality of services, and offers technical consultations, problem-solving and guidance. Researchers and groups have discussed the ways in which the educational sectors are shaped by knowledge intermediaries (Cooper, 2010; Ward et al., 2009b; CHSRF, 2003; Hossain & Shakir, 2001).

This study explained further that knowledge intermediaries have an important task in integrating internal and external resources, bringing together tacit interaction knowledge networks, and interpretation and translation knowledge networks, to create explicit knowledge; this must be assessed and uploaded to the relevant knowledge bases before being institutionalised and turned into institutional knowledge networks so that effective knowledge becomes an output. It is then necessary for the relevant key players involved in the networks to apply this knowledge as part of their decision making.

There are a number of reasons why inter-network connections are vital. These reasons include retrieving missing details from IT projects; offering traceability in knowledge channels; improving change management selection through the use of knowledge mobilisation, together with key project-oriented factors; identifying an optimal knowledge management strategy to manage change; addressing political issues; including all IT project parties in change strategies; and allowing lessons to be learned from previous projects. Each network greatly supports decision making across every process and stage of change.

Based on the findings of this study, it was revealed that a number of internal networks contain connections between communication channels that bring together IT project-related knowledge on innovation, development and production. The objective of such networks is to improve organisations' resource flow, whilst others aim to diffuse knowledge. Consequently, both informal and formal knowledge networks can exist. The former type represents networks that are impacted by culture, politics, shared values and common knowledge and interests, whilst the latter is associated with structural activities, organisational procedures, seminars, conferences, and business reports.

The results also explained that non-strategic knowledge networks have been influenced by the IT industry's drive to improve IT PM practices and experience. Thus, knowledge brokering, as highlighted during the interviews, aims to bring together various actors based on a common knowledge issue. The aim is also to raise concerns, offer best practice guidelines, and bring together knowledge sources and decision makers. This being said, knowledge brokering activities cannot be evaluated due to insufficient knowledge documentation, translation and interpretation. The findings of this study confirmed that it is particularly important to leverage the knowledge distributed in the organisation's network (Sambamurthy & Subramani, 2005) and to have knowledge of facts while implementing them into business procedures, policies, products and innovation (Lomas, 2007); at the same time, learning is an integral part of an innovative firm's core competency (Serrat, 2017).

The study findings differ from previous study by classifying KN activities into two groups: routinising knowledge network activities and routinising organisational business activities, while, at the same time, considering the alignment of key organisational factors and the strategy of knowledge networks. Such findings indicated that it is essential for key organisational factors to be taken into account alongside the chosen knowledge network strategy in order to support knowledge networks as part of long-term strategy. Explicit knowledge networks should be supported through the use of an IT support system. The following factors influence the routinising of knowledge networks activities (for more details see Chapter 5, Section 5.6.3). these are top management commitment, controls & audit, managing external changes, people management, incentive systems and clear goals and vision.

In the knowledge-sharing literature, top management roles are seen to be significant in promoting knowledge-sharing activities (Lin, 2007). Nevertheless, ChM studies have attributed the high failure of ChM projects to a lack of understanding of the nature of change

among top managers and inappropriate identification of influential activities (Altamony 2016; Keller & Aiken, 2009; Atkinson et al., 2006; Burnes, 2004; Elonen & Arto, 2003; Wynstra et al., 2001; El-Sabaa, 2001). Routinising organisational business activities includes: Resourcing, continuity management, information management, supplier communications and people development (see Chapter 5 Section 5.6.3 for more details).

The findings from both the interviews and documentation analysis strongly agreed that communication management is at the forefront of factors concerning KNs and knowledge channels while senior management was seen to be at the centre of knowledge channel activities. Although formal communication channels are positioned to monitor KN activities, informal collaboration facilitates knowledge exchange, networking, learning and creation among business partners or outsourcing agencies. Communication management is confirmed within the KM, ChM and PM literature as one of the most significant factors (Hislop, 2013; Crawford & Strohkirch, 2006).

Both external and internal knowledge networks are commonly grouped into two kinds of classification: delivery networks which focus on value added, and enabling networks to build the overall capacity of the organisation (Irani, et al., 2014; Seufert et al., 1999). Whilst knowledge networks are usually created in response to a unique set of circumstances, addressing issues regarding the effectiveness of such networks, their structure and governance, their efficiency, the availability of resources and their sustainability are vitally significant (Creech & Ramji, 2004). Thus, this study sheds the light into KNs initiation factors in IT projects that can have a significant impact on knowledge transfer; they offer a cheap solution for knowledge exchange processes (see Chapter 5 Section 5.6.3 for more details). Thus, this study further identified knowledge activities and components for each type of KN (see Chapter 6). These components provide an in-depth understanding of knowledge traceability and the connection of procedural knowledge to “lessons learnt”, ensuring their ability to support decision-making (Alkhuraiji et al., 2014).

7.4 Lessons learnt from the study

This section summarises the key “lessons learnt” from this study although these should not be used as guidance for implementing knowledge networks within organisations. The “lessons learnt” offer some perspectives that need to be taken into account in managing multiple IT projects to support decision making. These lessons are as follows:

LESSON 1: The lack of a national plan. A national PM body needs to be established to increase understanding of PM, KM and ChM issues across the IT industries. The following elements

need to be considered: the direction of ChM, and having a clear mission and vision, as well as clear business objectives and strategies. In addition, such a programme might include leadership and management styles and skills, communicating and sharing knowledge, and increasing the awareness of issues concerning organisational factors. Top management should create a knowledge management culture to make departments work more effectively together to link resources to the hidden residual knowledge. Issues concerning implementing formal budgeting, business and IT planning processes and governing policies should be adhered to (an internal audit will play a major role in providing assurance regarding policies and processes) while formal training assessments could be developed and delivered for training that has a direct effect on business activities. Finally, to promote innovation, a reward system should be put in place and regular evaluation and valuable proposals should be taken into consideration (Chauhan, R., 2009).

LESSON 2: To establish good knowledge practice for KNs. In this regard, the knowledge infrastructure is the main key that needs to be initiated. KNs mainly depend on the knowledge infrastructure, documentation, key actors, and routinising KN activities alongside business activities. This needs management to communicate the organisation's strategic direction more efficiently. Furthermore, employees should have more opportunities to be heard and become involved in decision-making processes; they should have more authority, innovation should be encouraged, and they should have more access to training. PM issues should be evaluated, studied, and solutions and errors should be documented. Senior management should communicate regularly and consistently about projects through different means that will need to be defined (Pandey & Dutta, 2013).

LESSON 3: The use of technology. A Shared Service Centre (SSC) should be created and linked to the knowledge base. This caters for effective inter- and extra-departmental interfaces (within the SSC and with business units); it also takes into consideration both receivers' and service providers' needs while employing integrated IT and business solutions. Governance, auditing and control, knowledge translation and coding, should be processed and structured, with PM activities being regularly reviewed, in order to offer best practice. Authorities and policies within the SSC should allow for greater authority by taking into consideration the materiality and/or impact of decisions (i.e. strategic or operational) (Gopal et al., 2015).

LESSON 4: The scarcity of national professionals. The industry lacks qualified people who can understand and develop a systematic approach to KNs in fields related to KM, PM and IT.

This is because internal business activities are strongly linked to external ones, which is why leading companies have established knowledge mapping to minimise business uncertainties and increase competitive advantage. Knowledge translation was seen by the participants as the key to robust institutional knowledge while lessening subjective decision making in IT projects. Knowledge mapping has been observed to be a good start for systemising KNs while knowledge brokers are the key movers in enhancing KN activities. Documentation does not always mean “lessons learnt” but, more importantly, it gives an insight into how to transform know how into action (Nicholas & Steyn, 2017).

The most common issues are:

- Strategies and direction are not shared across organisational levels causing disconnectivity across organisations’ departments and units.
- There is a failure to learn from outsourcing companies and business partners; lessons are not shared across all parties.
- Decision making issues are not discussed and evaluated so decisions are not delegated further down the hierarchy, resulting in deficient roles for departments and a failure to involve them or make them responsible for decision making. Interdepartmental relationships and issues could be improved if decision making is delegated further.
- There is a lack of transparency in problem solving to explain the organisation’s current status and future direction.
- Insufficient effort is being made to encourage people to take the initiative to solve problems, when both mistakes and good practice could be shared equally.
- Information management issues are the main cause of overlapping information and conflicting information in different systems; this frequently causes poor decisions to be made.
- There is a lack of knowledge-sharing enabling technology that aims to develop organisational knowledge to facilitate “lessons learnt”.
- KM infrastructure issues are not effectively identified. Implementing advanced technology without solving underpinning issues cannot work in the long term.
- There is a lack of training and expertise.

7.5 Summary

This chapter discussed in depth the evolution of KMob and KNs across the research phases. Further, it addressed the relations between the empirical findings and the literature and how

the key factors can influence a systematic approach towards KNs to align key knowledge mobilisation factors to support decision making in leading multiple IT projects. Identifying KNs was novel in addition to uncovering the underpinning issues and related key factors (see Figure 6.9 Evaluated CMKNM 4). The empirical findings of factors affecting KNs in IT project was addressed alongside the introduction of KNs key components. This is to advance the understanding of knowledge mobilisation and sharing across the boundaries. Key “lessons learnt” were drawn to effectively plan for KNs in IT project oriented change management to enhance business knowledge, minimise uncertainties in decision making process and related activities.

Chapter Eight Conclusions

8.1 Introduction

This chapter draws conclusions across all stages of the PhD project. In other words, it demonstrates how the two research questions of this study were answered via conceptual and empirical study, and how the knowledge gaps were filled. Additionally, it discusses the theoretical contributions and managerial implications, highlights the limitations of the research, and provides recommendations for further work.

8.2 Conclusions across all stages of the project

The broad picture of the whole project provides a clear understanding of how the research answered research questions and bridged the research gaps by contributing to the existing knowledge. Figure 8.1 visualises the key research activities of the PhD project and their inter-relationships.

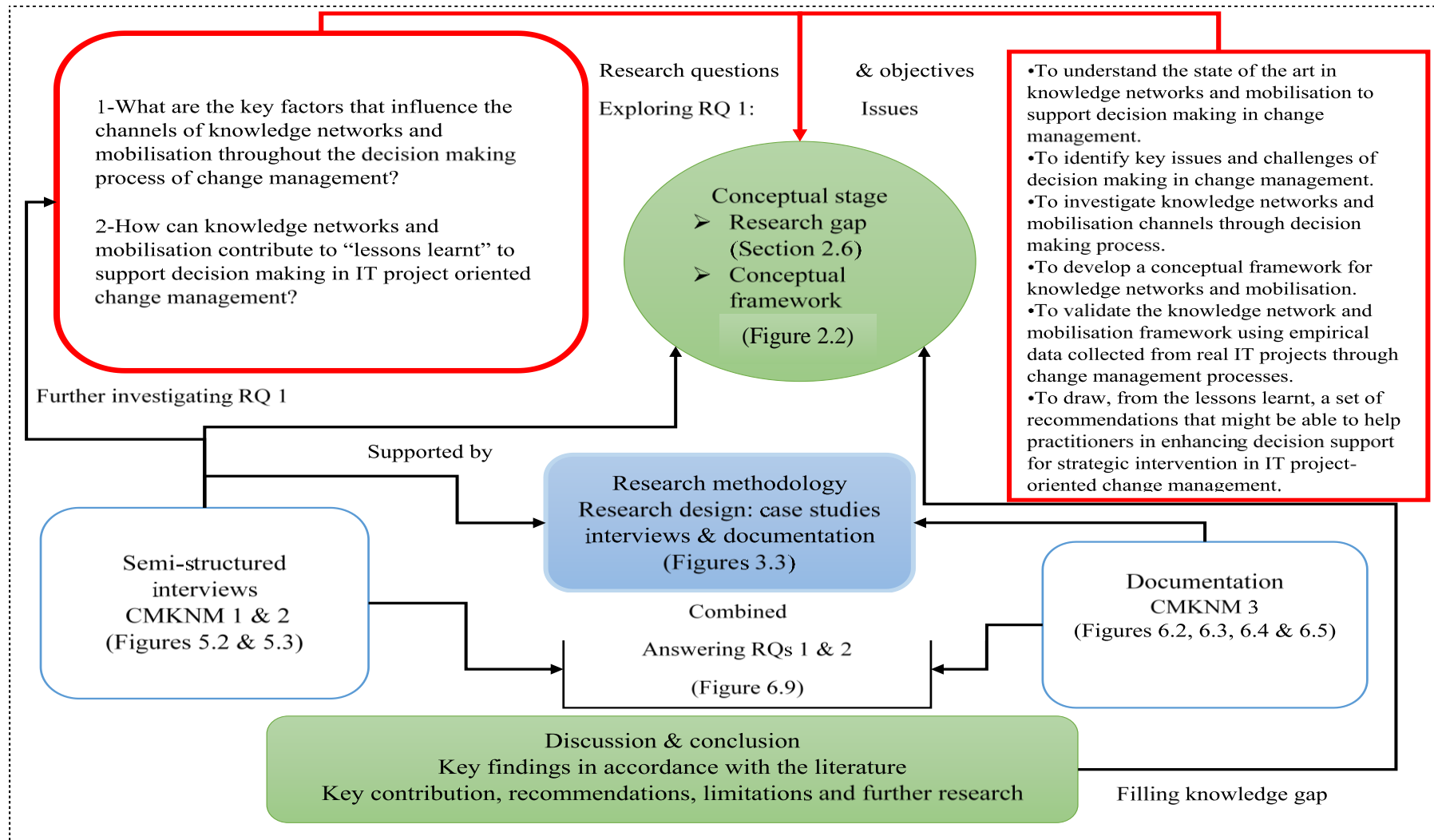


Figure 8.1: Links across all stages of the project

This study has considered two substantial research questions, as presented in the introductory chapter. They are:

1-What are the key factors that influence the channels of knowledge networks and mobilisation throughout the decision making process of change management?

2-How can knowledge networks and mobilisation contribute to “lessons learnt” to support decision making in IT project oriented change management?

At the beginning of the research project, the conceptual framework was established to correspond to the issues identified in the literature of KM, ChM and PM from broad meaning. This to investigate the first research question and further explore underpinning issues and factors. In line with the research questions, the first three objectives were achieved by understanding KNs and mobilisation, and then by identifying their key issues in decision making. The following key issues were identified through an in-depth review of the related literature in KM, ChM, PM and IT projects.

- Previous research has highlighted that most top, senior and section managers generally have insufficient understanding of the importance of change management strategies in IT projects (Jorgensen et al., 2008). This has caused inadequate identification of knowledge channels and connectivity through ChM processes to support decision-making (Gareis, 2010).
- Poor decision making is attributed to deficient key project details as a result of a lack of understanding of the KM strategies which will be used. This has caused poorly applied methods for project documentation whereby knowledge is not systemised to promote change strategies. As a result, it does not ultimately reveal “lessons learnt” (Ajmal et al., 2010; Gareis, 2010; Gould & Powell, 2004; Smith et al., 1999).
- KNs are not explicitly defined or understood and thus do not provide clarity concerning knowledge channels which commonly remain elusive. This has caused gaps in the collective knowledge among PM parties, causing ambiguity in decision support systems (Garcia-Lorenzo, 2008).
- Poor levels of employee involvement in mobilising their knowledge and supporting decision making are attributed to poor practice with regard to knowledge management strategies and applications (Ajmal et al., 2010; Hossain & Shakir, 2001; Rebecca, 2013).

Building on previous literature and filling some of the research gaps, this study also shed light on how KNs are built, how they could be structured, what social and technical issues were involved and what outcomes could be gained. This study also provided new insights into KN components and activities. Achieving integration between the identified issues concerning KNs and mobilisation through developing a framework was the key approach to answer the research questions and fill gaps in the current knowledge (See chapter 2). A qualitative approach, employing case studies (as described in Chapter Three) and utilising both interviews and documentation analysis, was adopted to evaluate the conceptual framework and validate the CMKNM framework (see Figure 6.9: Evaluated CMKNM 4). The fourth objective was achieved at this stage.

The first case study phase of semi-structured interviews established: new insights into KMob; identified a new knowledge layer of “know who”; addressed key KMob issues in IT project change; and defined key knowledge mobilisation factors in project-oriented ChM for structural knowledge networks. The establishment of a CMKNM framework was used to investigate knowledge mobilisation issues in IT project-oriented ChM and explored four types of network to mobilise knowledge for the support of decision making: knowledge networks of interaction that are linked to the knowledge networks of interpretation and translation via knowledge brokering; knowledge networks of interpretation and translation which are linked to institutional knowledge networks via knowledge bases or appropriate systems; when knowledge is institutionalised, the output will be effective when delivered by knowledge networks of influence (the fourth type of network) to target people in order to enhance decision making. Defining knowledge networks and their connections enables key knowledge mobilisation factors to be aligned. These factors comprise: organisational culture, strategies, capacity, structure, and knowledge infrastructure. Additionally, this allows knowledge channels to be traced in order to connect procedural knowledge to “lessons learnt” and thereby enhance decision support for strategic intervention in IT project-oriented ChM. The identification of key players (know who) in IT project ChM assists in building structural knowledge that is capable of dealing with uncertainties in change strategies for decision making. This finding places emphasis on the role of knowledge networks in aligning key knowledge mobilisation factors in IT project interventions and provides a new mechanism for such alignments with decision support systems. Knowledge can only be mobilised by considering the connections between key activities and key players in the decision-making processes. This is how the first research question was addressed and then explored to contribute

to “lessons learnt” to support decision making in IT project-oriented change management (see sections 5.2 and 5.6).

Whilst strategic decision making in innovative and implementable IT projects is critically addressed through structured knowledge networks, few organisations have implemented knowledge network framework to date. One of the reasons for this is the complexity involved in comprehending the creation of such a network. An effort has been made to achieve this, addressing a number of related challenges. IT project outsourcing studies have raised a number of topics, such as the structure and operation of networks, inter/intra-company strategies, organisational learning and knowledge-sharing in strategic partnerships, and collaborative learning. For instance, previous research has endeavoured to gain insight into knowledge sharing across numerous networks; the ways in which they are able to add value; the influence of knowledge brokering, as well as learning and knowledge distribution; and partners’ challenges with regard to sharing knowledge inside the network (Gupta & Polonsky, 2014). This study critiques and builds upon prior literature to explore several issues in attempting to build structured knowledge networks. It provides insight into the creation, structuring, socio-technical issues, and outcomes of knowledge networks. Documentation and traceability remain as key issues associated with structured knowledge networks today (see Section 6.2).

The documentation analysis phase was important to validate the findings and potentially discover a new emerging concept, as explained in Section 6.1. The documentation analysis results, as demonstrated in Chapter Six, confirmed the findings regarding the key knowledge mobilisation factors and key factors influencing knowledge channels. Additionally, the newly emerged concept of KN components, which offered further understanding of each KN activity, providing more details concerning knowledge traceability. To gain a deeper insight into specific issues occurring within a network, conceptualising the way how multiple realities are practised and conducted by different actors is a key to establishing a connection between declarative knowledge and procedural knowledge (see Figure 6.9). The evaluated framework of the CMKNM to mobilise knowledge to support decision making in IT project-oriented change management demonstrated the interactions among KNs, as well as their related key factors and sub-factors. The defined KNs facilitated further explanation of such interactions and illustrated how tacit knowledge converted to an explicit form. While declarative knowledge is obtained through knowledge networks of interactions and influence, procedural knowledge occurs throughout the interaction process of knowledge interpretation and translation, and institutional knowledge networks. Thus, the second research question and fifth objective was

accomplished by means of responding to the research question, while the sixth objective was partially achieved in Chapter Seven and finally accomplished through the set of recommendations.

Since KNs are explicitly or implicitly composed of actors that can be human and non-human, defining KNs aids comprehension of the multifaceted socio-technical challenges that arise in IT projects. Overall, this study identified new four types of KN, and highlighted the key issues and factors with regard to KNs in attempting to understand how knowledge can be mobilised in IT projects within and across the boundaries.

8.3 The theoretical contributions

Despite the fact that structured knowledge networks are expected to solve the issue of linking social capital with the sources of knowledge within and across the boundaries of an organisation, the underpinning theoretical issues of their implementation and application are still poorly understood by organisations. This reaffirms the essential need for more in-depth studies to examine implementation theories, as well as comparing the outcomes of such studies with the results of this research. In addressing this gap in the literature, KN processes and activities were investigated among public organisations and private companies in Saudi Arabia through multiple case studies using thematic analysis of the qualitative data. The following points highlight the key contributions made by this study.

- The study defined four new knowledge networks centred mainly around the classic SECI model. These are knowledge networks of interactions, knowledge networks of interpretations and translations, institutional knowledge networks, and knowledge networks of influence. These KNs perceive knowledge sharing as a dynamic process moves through various channels and connections (see Section 2.7). The KNs interact with each other via a variety of actors and actions within knowledge channels. The KNs define a set of actions and activities with the aim of structuring a theory which will be useful in providing practical solutions concerning knowledge mobilisation and sharing. knowledge networks of interaction, which are connected through knowledge brokering to KNs of interpretation and translation; KNs of interpretation and translation, which are connected through knowledge bases or suitable systems to institutional knowledge networks; the institutionalisation of knowledge leads to successful outcomes through the fourth type of KN, networks of influence, to support decision making through key actors.

- The study establishes new structured knowledge networks. A structured knowledge network framework brought significant understanding on the dynamic process of how knowledge is transferred and mobilised across boundaries to enhance the sharing, acquisition and documentation of knowledge in order to provide “lessons learnt”. Such framework allows the identified themes to be linked to their related knowledge networks. For example, the KNs interact with each other via a variety of actors and actions within knowledge channels. Key knowledge mobilisation factors, such as knowledge infrastructure, capacity, strategies, structure and organisational culture can be integrated and coordinated through the definition of knowledge networks and their connections. The KN applications offer the ability to cope with ambiguity in decision-making change strategies which can be acquired through “know who”, the determination of the major players in IT project change management (see section 5.2).
- The third contribution of this study concerns the development of a new knowledge mobilisation framework to facilitate knowledge sharing and transfer in a multi-organisational context. The framework clearly defines organisational factors and their influence on knowledge channels and knowledge networks. The study contributes to organisational, administrative and knowledge management theories regarding organisational strategy, organisational culture, organisational capacity, organisational structure, knowledge network externalities, knowledge network intermediaries, and knowledge network infrastructures (evaluated framework CMKNM 1 and 2 see chapter 5).
- The fourth contribution of this study is the identification of related influential factors and sub-factors for each type of KN by highlighting the interrelationships between these factors. This was achieved by conducting within-case and cross-case comparisons (see section 5.6). The results demonstrate that institutional knowledge networks are enhanced by the preservation of organisational data, resources and tacit knowledge. The preservation of such is translated into procedures and policies where organisational strategy and structure are formulated, and organisational culture is defined. Through the four types of knowledge networks, concerns can be raised, best practice guidelines offered, and knowledge sources and decision makers can be brought together. They play interchangeable roles in developing a common understanding of knowledge network activities, as well as changing or influencing business networks. Knowledge networks also play a significant role in bridging the gap between external and internal

resources, and connecting knowledge networks of interaction (tacit knowledge) to explicit knowledge (see sections 5.6).

- The fifth contribution of this study lies in the identification of sub-factors affecting knowledge networks in IT projects in addition to the main factors (see Section 5.6.3). These factors were identified under five main areas of IT projects: organisational factors, knowledge networks' environmental and critical factors, factors influencing knowledge channels, knowledge management infrastructure factors, and knowledge network initiation factors.
- The sixth contribution concerns the exploration of key components and activities of KNs which brings greater understanding of the nature of KNs and the communication of “lessons” learnt by connecting declarative knowledge to procedural knowledge (see Chapter six: section 6.7 and Chapter seven: section 7.2).

8.4 Managerial implications

In addition to the contributions to theory, this research offers implications for management practice in international, local private companies, and government agencies and organisations. These are:

☐ International companies

- Although international companies seem to have advanced KM practices with which to gain competitive advantage, building a KM road map should be seen as part of the infrastructure of KNs. Thus, the findings of this study could be put into practice by such companies defining their KN activities, especially in terms of external networks. While the current state of knowledge mapping assessment is already in hand, it is time to develop road maps for KN activities to facilitate the systematic measuring of actual effectiveness.
- Since the commercial success of international companies depends on long-term external collaboration with their customers, advanced KM strategies need external links with stakeholders collaborating within corporate strategies. This might help international companies to disseminate their practices of excellence to their customers and partners.

- Creating a joint KN strategy will help companies to understand their business partners' demands thus allowing them to better support business priorities, and to enhance processes, the design of services and co-innovation.
- Understanding the key components of KNs may help in the assessment and identification of critical external and internal knowledge, thus developing connections among the sources of knowledge for supporting decision making in IT projects.
- These key components of KNs may constitute an approach to thinking about automated KN architectures.
- The effective implementation of KNs is governed and facilitated by the factors identified in this study, alongside their underpinning issues, so international companies could benefit from a greater understanding of their KN practices.

☐ Private local companies

- Local private companies could develop a deeper understanding of the functional roles of knowledge intermediaries and brokering. The findings identified that private local companies are playing major roles in knowledge exchange.
- Further understanding of knowledge infrastructures should be enhanced to promote advanced practices regarding KNs.
- A ChM programme needs to be established alongside greater understanding in order to align KM and ChM activities. The findings suggest that there is insufficient understanding of comprehensive approaches to ChM.
- The findings revealed that organisational strategy, together with its structure, capacity, culture and knowledge infrastructure, should be aligned in such a way to support the identification of internal knowledge (i.e. knowledge residing within the organisation). These factors, alongside the factors influencing knowledge channels, needs more focus to support decision-making processes in leading or supervising multiple IT projects.
- Since international companies consider private local organisations as strategic partners in understanding local project management issues and constraints, private local firms should think of a strategic approach to create a joint strategy for knowledge exchange and KM practices.
- Implementing a KM office within the organisation's structure is seen as a key to success in joint collaborations within external networks.

- Incentive systems should be promoted to support and encourage all levels of employees to share their knowledge.

❑ Government organisations and agencies

- A national PM body has been seen an essential to regulate PM practices across the public and private sectors, to lead the development of national IT PM, and to establish R&D across public organisations. For example:
 - ❖ To create a joint IT strategy and understand the demands of business units to better support business priorities.
 - ❖ To create a joint finance strategy, defining the role finance can play in better supporting strategic business activities (e.g. cost accounting, collections), and in understanding and prioritising demand for financial reports.
 - ❖ To create a joint IT strategy and understand organisations' demands and assessments to better support business priorities.
 - ❖ To create a KM project management culture across public agencies and business units.
 - ❖ To create knowledge exchange programmes with outsourcing agencies in order to identify best practices in projects.
 - ❖ To attract and retain employees; this is a significant challenge for KM activities, with high levels of staff attrition and significant recruitment delays being commonplace.
 - ❖ To create a competency-focused salary and grading structure that reviews employees' engagement in KM activities.
 - ❖ To build solid KM infrastructures that promote documentation.
 - ❖ To confront issues regarding knowledge coding and information overlap which were seen to be constraints holding back decision support systems.
 - ❖ To address and solve decision delegation issues across business divisions and units.
 - ❖ To understand key knowledge mobilisation factors before implementing KN approaches.
 - ❖ To see outsourcing strategies from a broader perspective for leading multiple IT projects (i.e. implementing KN approaches to outsourcing strategies) instead of considering outsourcing as a one-off strategy.

- ❖ To consider more carefully organisational structures as there are many issues where these either support or discourage KN initiatives.
- ❖ To deepen understanding of cultural issues in organisations as these were often seen as barriers to adopting KN strategies across public agencies (e.g. silo culture).
- ❖ To implement KM and PM offices across public organisations.
- ❖ To increase collaboration with human resource agencies to identify the skills needed across all business units and to build the recruitment capability to allow the required staff to be hired.
- ❖ To plan and forecast staffing levels regularly and to understand the organisational development expected within business departments and units. These plans should list the competencies that are currently available within the organisation (i.e. skills' register) against the competencies that are required, and list strategies for training or hiring employees with the necessary competencies.
- ❖ To reengineer performance appraisal processes in a systematic way to support KM practices.
- ❖ To clarify employees' training accountabilities with Training Centres. An ongoing training programme should also be introduced to ensure key employees are equipped to operate within IT PM activities.
- ❖ To agree and document clear job descriptions for the new, shared, service centre roles, clarifying the skills, accountabilities and responsibilities required. Regular reviews need to be documented to ensure more effective assessment.
- ❖ To create a classification approach and standardisation initiatives for outsourcing companies as strategic direction KNs.
- ❖ To create a corporate strategy for stakeholders to identify related issues in leading multiple IT projects.

❑ Top management

- To engage further with all business units and divisions to understand the expected growth and roles in the organisation in the medium to long term, and to define an organisation roadmap, including a skills' register and skills' gap analysis.

- To rethink (by top managers) the management of corporate communication that supports the utilisation of KNs (i.e. structural, strategic and cultural issues).
- To align IT functionally within the organisation, with different business units performing different stages of IT projects. Specialists need to be identified as the system owners, managing changes across the whole environment.
- To implement a project-based organisation within IT, with a mandatory PM framework (including business cases) for all significant projects.
- To clarify and rationalise, reporting lines should be enhanced owing to decision-making issues which are attributed to a lack of delegation further down the hierarchy. This results in ineffective collaboration across public agencies, departments and units.
- To implement employee engagement schemes in decision making, as decision approval lines are often subject to long delays.
- To formalise the assessment of the multi-lingual capabilities of systems in order to create a translation unit to publish key documents in English to allow effective engagement with external KNs (i.e. international experts and companies).
- To address the lack of professionally certified employees. This results in a high dependency on individual efforts and informal practices. Best practices and world leading standards should be the concern of top management to encourage the pursuit of professional qualifications.
- To establish a strategy for PM assessments, comprising leadership support and approval. This would help in overcoming shortcomings, creating a roadmap of relevant projects, addressing gaps, clarifying key milestones and dependencies, and yielding some short-term wins.
- To think about the KM infrastructure as a key success for PM and KNs.
- To implement a change management programme, supported by KM applications, across public organisations.
- Finally, the results of this study could be used by Saudi decision makers and top management in the IT public sector to initiate a national project management centre as a central agent within knowledge networks. This could provide traceability and connect procedural knowledge to “lessons learnt” among public and private organisations.

8.5 Limitations of the study

A number of limitations need to be considered. For instance, this study considered seven case studies with 34 experts, specifically in Saudi Arabia, in the area of ChM, KM and IT PM.

However, this study does build on the findings of existing work in related areas. Although the literature still lacks examinations of theories on the implementation of KNs, in particularly in IT projects in Saudi Arabia, the findings of this research might be taken further with more case studies or by using different methods to strengthen the findings in different countries. Furthermore, this study used a qualitative method so the results have been interpreted with regard to how ChM and KM strategies are employed within IT projects in organisations in Saudi Arabia. Thus, the CMKNM framework should be further examined with IT managers and policy makers across different countries, using opportunistic sampling to spot opportunities where they arise. Moreover, the identified factors affecting KNs in IT projects require further examination and measuring by employing quantitative studies. This is because this research used only two sources of evidence, semi-structured interviews and documentation, which were accessed to a limited extent due to restricted access, confidentiality and privacy issues. Thus, future studies could find further sources of evidence to strengthen the findings.

8.6 Recommendations for further research

As highlighted in Chapter Two, most previous KM studies were quantitative, even though qualitative studies offer a rich and in-depth evaluation of the organisational context in which KM activities occur. Thus, it would be informative to identify the specific managerial behaviours and actions that individuals believe demonstrate support for knowledge networks. For example, such investigations could target employees' knowledge ownership in terms of the processes by which employees acquire perceptions of ownership in PM. Such studies might bring useful insights into how organisations can promote involvement in knowledge networks of the types identified. Further work could be undertaken to examine qualitatively the interrelations between KNs and KN components. It is suggested that the CMKNM framework might be transformed into a large-scale survey questionnaire; this might provide a generic impact to the constructs comprised in the model. The structured knowledge networks' model proposed in this study could be further tested in other national and cultural settings. Further studies might also investigate the model, its components, and relationships with further case studies to establish its viability as a means to understanding structured knowledge networks and strategic decision-making.

A large-scale survey questionnaire could possibly consider the third parties, outsourcing agencies and targeted organisations involved in specific knowledge networks or knowledge exchange processes by using purposive sampling to evaluate knowledge networks in knowledge mobilisation to support decision making. Further investigation is needed regarding

“know who” and its role in enhancing decision making in IT project-based change management (i.e. the role of key actors in PM who transform knowledge into action). Furthermore, a hybrid technique (a combination of qualitative and quantitative approaches) could be explored to anticipate demand from both IT vendors and stakeholders in order to understand the full scope of the efforts required in decision support processes for the success of IT projects based on ChM and KM. It is important to recognise that quantitative studies of KNs are rare because of significant limitations with regard to issues and factors. Thus, the identified factors affecting knowledge networks and channels in IT projects could be further tested to understand the effectiveness of KN factors in promoting knowledge sharing and mobilisation across boundaries.

8.7 Summary

This chapter highlights the key findings of this thesis and includes conclusions from all stages of the research; it also covers the theoretical contribution, managerial implications, limitations of this study and suggestions for further research. In addition, this chapter explains how the research questions were answered alongside how the objectives were met. Thus, it demonstrates how research gaps were filled and the aim of the research, to provide empirical evidence and literature to support decision makers in planning KNs in IT project ChM was achieved.

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Appendices

Appendix A: Categorisation of theories and models of ChM and terminology

Table A 1: Categorisation of theories and models of ChM (Kezar, 2001).

	Evolutionary	Teleological	Life cycle	Dialectical	Social cognition	Cultural
Definition	Change occurs as a natural response to the external environment (Kezar, 2001; Morgan, 1986).	Refers to planned change based on purpose; usually goes through a rational or linear process where individuals are influential to the process (Kezar, 2001; Carr, Hard and Trahant, 1996; Carnall, 1995).	Refers to studies which concern the growth, of children, stages of aging associated alongside organisational maturity (natural growth and decline) (Kezar, 2001; Levy and Merry, 1986).	Relates to political theories that consider change as a result of opposing beliefs or ideology systems causing conflicts (Kezar, 2001; Morgan, 1986; Bolman and Deal, 1991).	Change is considered to be like the mental processes of development including growing, learning and changing behaviour and perspectives (Kezar, 2001).	Related to beliefs, values, assumptions and norms. Requires long term plan (Schein, 1985).
Reason for occurrence	External pressure, movement and demands (Kezar, 2001)	Inter-organisational strategy for either competitive advantages or organisational needs. Purposeful strategy (Kezar, 2001).	Natural developments as a result of training, education and other learning tools (Kezar, 2001).	Opposing values, beliefs and concepts occur during a dialogue of bargaining, negotiations (Kezar, 2001).	Growing expectation results from social value added.	As a result of environment change or cultural change

Process of change	Gradual change.	Rational, purposeful and linear (direct orientation).	Natural movement and stages of developments.	First: Power enforcement Second: Empowerment after discussion and debates Third: Institutionalisation.	Motivation, training, learning and interaction.	A very slow process that cannot be predicted because it is a mix of inter-independent and independent.
Outcomes	Reprocessing and restructuring.	New standard and value as a result of restructuring.	New organisational identity has set of renewed functions and administrations.	New trend and perspective of belief.	Growing capacity of thought.	New culture (Kezar, 2001).
Examples	Strategic change to keep pace with external market	Organisational strategy and standard (new management approach)	A birth of new organisational identity has new structure, models, organisational culture; has to go through life cycle (maturity)	New political approach has room for debates and negotiation leads to different style of policy	Individual and group learning leads to motivation and sense making (Kezar, 2001).	Interpretive culture, belief shifting
Strengths	Environmental emphasis and system approach (Kezar, 2001).	Highlighting the role of change agent, strategies and recourses.	Change through phases of development, temporal strategy throughout phases.	The need for power to make the change swift.	Concern with social issues of change to win the change.	Understanding of different context, deep insight into values and beliefs and norms
Weaknesses	Ambiguity of change boundaries and lack of proper prediction causing quality disruption (less personal control)	Excessive rationality and linearity resulting in lack of second order explanation of change (need high level of experience and motivation)	Empirically less proved, unique organisational character so challenging to generalise	Lack of environmental concern causing unpredictable responses and ambiguity of shared beliefs and values and goals	Lack of attention towards emotion and values, concentrating more on ease of change (Kezar, 2001).	Lack of leaders' guidance and universal differences.

Terminology:

Terminology is defined as “the system of terms belonging or peculiar to a science, art, or specialized subject; nomenclature: *the terminology of botany*”, (*dictionary.com*, 2012).

Knowledge:

Knowledge is defined as “justified true belief” and also “a dynamic human process of justifying personal belief towards the truth” (Nonaka & Takeuchi 1995, p.58).

Management:

Management is defined as

“The organization and coordination of the activities of a business in order to achieve defined objectives. Management is often included as a factor of production along with, machines, materials, and money. According to the management guru Peter Drucker (1909-2005), the basic task of management includes both marketing and innovation. Practice of modern management originates from the 16th century study of low-efficiency and failures of certain enterprises, conducted by the English statesman Sir Thomas More (1478-1535). Management consists of the interlocking functions of creating corporate policy and organizing, planning, controlling, and directing an organization's resources in order to achieve the objectives of that policy” (*Business dictionary.com*, 2012).

Knowledge Management:

Knowledge management is defined as “the basic aim of knowledge management is to leverage knowledge to the organization’s advantage”. (Nickols 2000 cited in Dalkir 2005, p.4).

Procedural Knowledge:

Is how to achieve a task, and is attained through rules in which instructions are performed step-by-step, it has critical roles in structuring concepts and gaining declarative knowledge (Yılmaz & Yalçın, 2012 p.50; Star, 2002)

Lessons Learnt

Is the practice of recording the knowledge gained by a project at project close. It's often focused on failures, inefficiencies and project issues that can feed into improving future projects. Lessons learned is also is a final chance to leave behind knowledge about the project that may

be useful for future purposes such as audits or service support before the project team breaks up (Spacey, 2016 at <http://simplicable.com/new/lessons-learned>).

Project:

Project is defined as “Planned set of interrelated tasks to be executed over a fixed period and within certain cost and other limitations” (Business dictionary.com, 2012).

Project Management

Duncan (1996) defines project management as “the application of knowledge skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from the project”. It is a cyclical process of planning, monitoring and review, where strong inference is placed on communication during the planning stage (Reiss, 1992). Duncan (1996) further expands on the project management process, viewing it as encompassing the stages of project initiation, planning, execution, control and the closing process (L. Dooley, G. Lupton, D. O'Sullivan, (2005) "Multiple project management: a modern competitive necessity", Journal of Manufacturing Technology Management, Vol. 16 Iss: 5, pp.466 – 482)

Orientation:

➤ **Strategic Orientation:**

Strategic orientation is defined as

“Strategic Orientation is the ability to link the long-range vision of Aboriginal self-determination to daily work, ranging from a simple understanding to a sophisticated awareness of the full impact of thinking and actions. It is the ability to think and operate broadly, with the goal of sustainability, to further the goals of Aboriginal people in a way that meets the collective public interest. This also means taking responsibility to collaboratively design and implement steps to redress past harms and set frameworks in place to prevent their recurrence” (MyHR, Human Resources for the B.C. Public Service, UK, 2012) .

➤ **Process Orientation:**

Process orientation is defined as

“Process Orientation places a priority on "how" things are done. It is a willingness to remain open and follow in new directions. It means setting aside mainstream ways of achieving results and instead following culturally respectful processes that also produce results. It is letting go of agendas or the need to control, and trusting that the appropriate outcome will emerge from a good journey together. It means accepting that both the use of process orientation and a "good

relationship" are concrete deliverables" (MyHR, Human Resources for the B.C. Public Service, UK, 2012).

➤ **Orientation:**

Orientation is defined as "the act of orienting", "an integrated set of attitudes and beliefs" •S: and "position or alignment relative to points of the compass or other specific directions" is synonymizes predilection, preference, orientation (a predisposition in favour of something)" An example of orientation is that "a person's awareness of self with regard to position and time and place and personal relationships), (WorldnetWeb, 2012).

Change Management:

Change management is defined by business dictionary (2012) as "Minimizing resistance to organizational change through involvement of key players and stakeholders".

From this definition, there need to define change, organisational change and stakeholders. Change simply is defined as making something "partly or completely" "positively or negatively" different, that the new object, item, order, character, behaviour, attitude and etc, can be recognisable (Alkhuraiji, 2012).

Organisational Culture: this refers to the beliefs, perceptions and values shared and held by business staff (Wilson 2001, pp.253-259).

Organisational Change:

Company or organization is going through a transformation. Organization change occurs when business strategies or major sections of an organization are altered. Also known as are reorganization, restructuring and turnaround (Business dictionary.com, 2012).

Plan change:

Plan change is defined as "individuals' perception that deliberation and preparation have occurred prior to the implementation of change" (Rafferty & Griffin, 2006).

Emergent change:

Emergent change is defined as "A set of certain consistent actions that form an unintended pattern that was not initially anticipated or intended in the initial planning phase. For example, although unintended, adopting an emergent strategy might help a business adapt more flexibly to the practicalities of changing market conditions", (Business dictionary.com, 2012).

Appendix B: The consent form

Consent Form



What is this project about?

This research aims to address the issues through the investigation of knowledge network modeling in supporting decision making for strategic intervention in IT project-oriented change management. The objective is to investigate knowledge mobilisation channel through decision making. Further, a conceptual framework is underdevelopment based on the identification of the issues surrounding knowledge channel towards decision support system. This would contribute to enhance decision making and.

Who are we?

This project is undertaken by Ali Alkhuraiji, a PhD student with School of Management at Plymouth University. The supervisors are Professor Shaofeng Liu and Dr Fenio Annansingh,.

Confidentiality

All information given will be treated confidentiality. Published work will always anonymise any responses and never identify the source. Any audio–recording will be kept securely and will be destroyed no more than 12 months after the PhD viva.

Right to withdraw

Participation is voluntary and you have the right to withdraw from the study before 01/10/2014. Please note that after the date given above, we will not be able to withdraw the data as a substantial amount of work would have been done.

Feedback

You may obtain information on the project progress or a summary of the findings of the research by contacting ali.alkhuraiji@plymouth.ac.uk

Thank you in advance for your interest and assistance with this research.

Participant's Name:

Ali Alkhuraiji

Participant's Signature :

A handwritten signature in black ink, appearing to be 'Ali Alkhuraiji', with the date '10/06/2013' written below it.

Date: __10/06/2013_____

Appendix C: Semi-structured interview template

A. General organisations information?

A.1 How many subsidiaries or branches does the Programme have? Or tell me about your work in general?

كم عدد الأقسام أو الفروع التابعة لهذا البرنامج يسر وكيف تتم عمل ادارته؟

a. If there are subsidiaries or branches, are there close links administratively between the program and the other projects in the other organisations? Please explain.

إذا كان يوجد أقسام أو فروع لبرنامج يسر كيف يعمل هذا البرنامج إدارياً مع المشاريع التي يشرف عليها بشكل تلقائي أو يقوم بالإشراف عليها بالدعم اللوجستي أو المعنوي لو سمحت اشرح باستفاضة؟

A.2 What is the "organisation" (or your organisation) policy with regard to the purchasing, adoption and implementation of IT projects?

ما هو النظام المعمول به في يسر من خلال الاتفاق مع الشركات التقنية لشراء المعدات المطلوبة في التقنية واعتمادها والعمل على ارسائها وتشغيلها؟ كيف يتم هذا من خلال مشروع كامل لإدخال أي مشروع تقني؟

A.3 What are the rules imposed by the IT department regarding this policy?

ما هي الآلية المتخذة من قبل إدارة التقنية أو المسؤولين التقنيين حيال الانظمة المعمول بها؟ وماهي ملاحظتهم وكيف يستطيعون خلق آلية مناسبة لأنجاح تلك المشاريع التقنية في ضوء السؤال السابق؟

A.4 Do you have a specific department concerning IT projects issues?

هل يوجد لديكم قسم خاص لمعالجة القضايا المتعلقة في مشاريع التقنية؟

a. If yes, what rules are imposed by this department regarding the purchasing, adoption and implementation of IT Projects?

إذا كان هناك، ماهي الأدوار المناطة لحل القضايا المتعلقة بالمشاريع التقنية بالشراء واعتماد المشاريع وإدخالها وإدارتها؟

A.5 Is there any interest in the managing by projects field and/or participation in related IT projects activities? Please explain. How the work is done for the IT projects? From planning to the project close?

هل لديكم خلفية عن ادارة المشاريع التقنية من خلال مايسمى

Managing by project

او مانستطيع تسميتها باللغة العربية ادارة تقسيم المشاريع على شكل جزئيات مشروعية في كل مرحلة من المشروع لها

طريقة في الادارة واستراتيجية محددة؟

هل يتم ادارة المشاريع التقنية على انها مشروع كامل, او على شكل برامج تدار على حدة وماهي النهجية التي تدار فيها

المشاريع التقنية؟

B. Organisational Factors

B1. How are your views towards IT infrastructure organised in your organisations or other organisations you worked with?

ماهو تقييمك للبنية التحتية التقنية للمنظمة بشكل عام او في المنظمات التي عملت او تتعامل معها؟

a. Is there any central integrated infrastructure or does each subsidiary have its own infrastructure? Please explain.

هل يوجد بنية تحتية تكاملية و مترابطة بين الاقسام او كل قسم له بنيته التحتية وتتفاوت البنى التحتية من قسم الى اخر وماهي

برأيك اسباب هذا التفاوت؟ لو اسمحت اشرح لي باستفاضة؟

b. What is the big picture of the integrated IT infrastructure in your organisation or any organisations you dealt with in any IT projects?

هل تستطيع ان تعطيني ماهي رؤيتك عن البنى التحتية التقنية المتكاملة و المترابطة وماهي ادوارها في تهيئة ودعم مشاريع

التقنية؟

B2. Could you specify the name of IT projects that are implemented in your organisation?

هل تستطيع ان تذكر لي مثال عن احد المشاريع التقنية وكيف تم تنفيذ المشروع, هنا انا لاابحث عن نجاح المشروع او فشله

وانما ابحث عن افضل الطرق المتبعة لادارة المشاريع التقنية وكيف نستطيع ان نتغلب على المشاكل التي تواجهنا حتى

نستطيع رسم الية ومنهجية تكون مرجعا لادارة المشاريع التقنية؟

B3. What were the main business problems the organisation faced before signing IT projects?

ماهي المشاكل الرئيسية التي تواجه المنظمة قبل توقيع المشاريع التقنية؟ وكيف نستطيع التغلب عليها؟

B4. What are the main motivations for successful IT projects?

C. Initiated the idea of IT projects

ماهي بوجهة نظرك المحفزات الرئيسية لانجاح المشاريع التقنية؟

C.1 Who initiated the idea of IT projects? explain in details please?

من هم الاشخاص او الاقسام المسؤولة عن ابداء الافكار المتعلقة بمشاريع التقنية؟ وهل هي محصورة على هؤلاء الاشخاص او الاقسام وماهي الالية او المنهجية التي يتم على ضوءها اختيار تلك الاقسام او الاشخاص؟ لو سمحت اشرح لي؟

C.2 What are your rules in the adoption and implementation process?

ماهي الاليات والانظمة والمنهجيات المعمول بها في مراحل اعتماد المشاريع وتنفيذها؟ هل يوجد الية محددة؟ او عدة اليات؟ ولماذا الاختلاف؟ ومن يستطيع التمييز بين تلك الاختلافات فيما يؤثر ايجابا على تلك المشاريع؟

C.3 Were there any concerns about the current IT infrastructure before planning an IT project?

هل تولون دائما اهمية للبنى التحتية التقنية قبل التخطيط للمشاريع التقنية؟ على سبيل المثال احد المنظمات تطلب

ERP system

وهم ليس لديهم تكامل تقني بين الاقسام؟ فهل هذه الاشياء دائما تؤخذ بالحسبان قبل التخطيط

C.4 How are the selected options of IT projects being supported?

عندما تختارون مشروع معين لنظمة معينة كيف تستطيعون معرفة ماذا كان هذا المشروع يتلاءم مع المنظمة المقصودة وماهي الالية لدعم المشاريع المختارة؟ وماهي المشاكل التي تواجهونها في هذا السياق وماهي الالية المتبعة لحلها؟ وتجاوزها؟

C.5 What was the impact of the intervention of IT projects?

ماهي التأثيرات الجانبية على المنظمة عن القيام بادخال مشروع تقني جديد؟ وكيف يتم تجاوز هذه المشاكل وماهي الالية او المنهجية المتبعة او السليمة بوجهة نظرك؟

C.6 What barriers derived from IT projects in the organisations?

ماهي المعوقات الرئيسية التي تسبب عرقلة المشاريع التقنية حال تنفيذها في منظمة معينة او بشكل عام؟

b. What solutions are being introduced to overcome these barriers?

ماهي الحلول المطروحة لحل تلك المشاكل وهل تستطيع التنبؤ بمشاكل قد تحدث خصوصا في المرحلة التخطيطية وهل هذه المشاكل تحفظ في كتيبات او في قاعدة بيانات للمشاريع التقنية القادمة؟ وهل الوصول اليها من قبل الاشخاص المعنيين بادارة المشاريع سهل؟

C.7 In your opinion, what other organisational factors are likely to influence the IT project intervention in the organisation?

في رأيك ماهي العناصر الرئيسية في المنظمة التي تؤثر على ادخال مشاريع تقنية وترسيبتها وادارتها وتنفيذها ومباشرتها؟

C.8 What are change strategies used when leading IT projects?

هل تمارسون اليات ومنهجيات ادارة التغيير في المشاريع التقنية؟

C.9 How can you select appropriate change strategies?

كيف تختارون استراتيجيات معينة لادارة التغيير؟

C.10 What are the challenges and obstacles facing the selection of change strategies? And explain why please?

ماهي الاشياء والتحديات التي تواجهونها عند اختيار استراتيجيات معينة للتغيير؟

C.11 Who make the decision of selecting change strategies and what are the criteria of selecting change strategies? And why?

من المخولين لاتخاذ القرار القرار لاختيار المنهجية المناسبة لاستراتيجيات التغيير وماهي المعايير المعمول بها لاختيار استراتيجيات التغيير؟ ماهي المعايير والاسس المعمول بها لاتخاذ صنع القرار في اختيار الية التغيير في المشاريع التقنية؟

D. Factors influence Knowledge channel

D1. Did you use any evaluation tools for IT projects before the adoption process? Please explain.

هل تستخدمون الية تقييم للمشاريع التقنية قبل اعتمادها؟ لو سمحت اشرح لي

D2. How can you identify knowledge holders, information that leads you to make decision in selecting change strategies?

كيف تستطيعون معرفة الأشخاص أو الأقسام أو الأنظمة التي تحتفظ في معلومات ومعرفة حقيقية في ما يدور داخل المنظمة وطريقة العمل بها وطريقة التواصل بين الأقسام والأشخاص المؤثرين بالعمل قبل اختيار الاستراتيجية المناسبة لإدارة التغيير في المشاريع التقنية؟

D3. Is there any method used? i.e. systems, knowledge base? Please explain in details?

كيف تستطيعون الحصول على المعلومات الكافية وكيف تستطيعون معرفة ما إذا كانت هذه المعلومات قيمة ودقيقة تفودكم لصنع واتخاذ قرار مناسب ماهي الآلية المعمول بها للتأكد من المعلومة؟ وهل المعلومة تحفظ في نظام للرجوع لها في المشاريع القادمة؟ ومن المسؤول عن حفظها هل يوجد نظام تكاملي يمكن إدارات المشاريع في الحكومة الوصول للمعلومة المفيدة؟

D4. Who involves in making decision? And how can you know that those people involve in decision making are the key people? Please explain?

من الأشخاص الذين يتم اختيارهم لصنع القرار؟ وكيف نستطيع التأكد من الأشخاص المختارين هم من يحمل المعرفة والمعلومة الصحيحة لصنع قرار مناسب؟ وكيف نستطيع حصر جميع مصادر المعلومات من حيث إن لانهم أشخاص قد يكونون أكثر أهمية في مصادر المعلومات من الأشخاص الذين تم اختيارهم؟

D5. How do you reach them? What methods do you use? What are the challenges? Do they key people are save in your systems for future references?

كيف تصلون إلى من يحمل المعلومات القيمة والمعرفة بما يدور بالمنظومة خصوصا وإنها تمثل أهم جزء في إدارة المشاريع التقنية من خلال التخطيط وتصميم المشاريع واعتمادها وتنفيذها ومباشرتها ودعمها؟ وهل يوجد آليات محددة أو استراتيجيات مرسومة ومدرسة؟ وماهي المصاعب التي تواجهونها؟ وهل يوجد دليل واضح في النظام التقني للوصول لأصحاب المعلومة للمشاريع التقنية المستقبلية؟

D6. In large IT projects, how do you identify business need, and how do you make IT project meet business objectives?

في المشاريع التقنية الكبيرة كيف تستطيعون التعرف على ماتحتاجه المنظمة فعليا وكيف تستطيعون التحقق من تلك الاحتياجات وكيف تستطيعون تفهم تلك الاحتياجات لخلق أفكار للمنظمة والتي قد لاتفهمها تلك المنظمة اما لضعف الثقافة التقنية أو الإدارية بشكل عام أو لوجود مشاكل في ثقافة المنظمة غير واضحة للتقنيين والإداريين؟ كيف تجعلون تلك الاحتياجات تتوافق مع ماتتطلع اليه المنظمة وأهدافها؟

D7. Who define business objectives? And how can you make sure that there are no missing important details that can effect on the overall projects? Is there any method or systems used?

من هو المسؤول قسم او اشخاص عن رسم الية احتياجات واهداف المنظمة وكيف يستطيع هؤلاء الشخصا التأكّد من سلامة ودقة هذه الاهداف والاحتياجات على انها كاملة لرسم تصور كامل عن المشروع بحيث ان المشروع لا يتأثر لاحقاً بمعلومات ناقصة؟ هل يوجد منهجية او انظمة معينة تساعد على الحصول على المعلومات الدقيقة

D8. How important it is?

هل هذه المنهجيات والانظمة للحصول على المعلومات الكافية والقيقة مهمة في ادارة المشاريع؟

D9. How can you connect different parties? Such as departments, vendors, decision makers, key knowledge holders, organisation dimensions?

كيف تستطيعون العمل خلق اتصال بين ادارة المشروع والشركات المنفذه للمشاريع وراسمي استراتيجية المشاريع والجهة المعنية في المشاريع؟ كيف تعمل قنوات الاتصال لديكم مع كل من له شأن فب المشروع من اقسام ومنظمات واشخاص وانظمة؟ من هم الاشخاص او الاقسام الذين لديهم معرفة وهل تؤثر هذه الجهات على اتخاذ القرار؟ برأيك هل توجد اشياء اخرى تؤثر على القرار؟

D10. How can you connect between organisation structure, capacity, culture, and strategy to enhance the success of IT projects?

كيف تستطيعون خلق تناغم واتصال بين الهيكل التنظيمية وثقافة المنظمة وقدرتها الثقافية والمالية والبشرية واستراتيجية المنظمة مع مشاريع التقنية المقترحة؟ وهل هذه العناصر لابد ان تولى اهتمام عن التخطيط لإدخال او تنفيذ مشروع تقني وهل يوجد اشياء اخرى يجب ان تؤخذ بالحسبان؟

D11. What are the most important factors to be taken into account when dealing with IT projects intervention?

ماهي العناصر الرئيسية التي يجب ان تؤخذ محل العناية الفائقة عند التفكير في مشروع تقني سوف يتم ادخال للمنظمة؟

D12. How important is the organisations maturity in terms of its IT maturity when selecting change strategies? And how do you select change strategies based on IT maturity? How effective to have IT infrastructure already there compared to those organisations that have poor IT infrastructures?

مامدى اهمية نضج المنظمة او المؤسسة من الناحية التقنية (اعني في ذلك البنية التحتية التقنية ومهارات العاملين مع التقنية) عند التفكير في ادخال مشروع تقني جديد؟ وهل تتخذون نمط اخر في ضوء ادارة التغيير من مشروع الى اخر ولماذا؟

D13. How important to have knowledge base that combine past IT projects? Please explain?

مامدى اهمية ان يكون هنالك قاعدة بيانات متكاملة و معرفية تحتوي على ملفات ادارة المشاريع وكيفية رسم الاستراتيجيات والمشاكل التي تظهر في المشاريع وكيفية حلها؟ هل يوجد انظمة معينة؟ وهل هذه الانظمة فعالة؟ وهل يوجد خيارات افضل؟

D14. Have you carried out any pilots or viewed any demonstrations regarding IT projects intervention? Please specify the name of the system and the names of the supported decision making in IT projects. What available sources are being used to explore the area of IT projects?

هل سبق ان قمتم بعمل فحص ووسائل تقييم لادارة المشاريع التقنية وهل قمتم باثبات العناصر الاساسية لنجاح المشاريع التقنية؟ هل لديكم انظمة تساعد على اتخاذ القرار في المشاريع التقنية في مرحلة خلق الافكار والتخطيط ورسم الية المشاريع ومباشرتها وتنفيذها وتقييمها بعد الانتهاء؟ وماهي المعايير التي تستخدمونها لقياس مدى نجاح المشاريع التقنية؟ وهل هي محفوظة لديكم في انظمة للرجوع لها في المشاريع اللاحقة؟

- a. What are the main costs (e.g. hardware, software, development, maintenance, consultancy, employees' training, business process re-engineering, organisational restructuring, standard body membership ... etc.) associated with the IT project intervention? And why? Do you think?

ماهي الاشياء المكلفة في المشاريع التقنية من حيث استهلاك الوقت والمال والجهد (انظر للسؤال باللغة الانجليزية) والتي ترتبط بالمشاريع التقنية

- b. Were the costs planned or there were any additional costs that cannot be expected?

Please explain.

هل التكلفة عادة تكون محسوبة مسبقا وهل هناك تكاليف اضافية لاتستطيع معرفتها مسبقا وانما تعرفها عند تنفيذ المشاريع؟ لو سمحت اشرح لي

- c. What impact does prior knowledge of these costs have on the continuity of IT projects?

هل التصور المعرفي الكامل للتكاليف في المشاريع التقنية مفيد في نجاح المشاريع واستمرارها؟ وهل يوجد عناصر أخرى تشارك معرفة التكلفة في هذه الأهمية؟

- d. What are the main characteristics or aspects of leading multiple IT projects that have to be taken into consideration before the planning, designing, singing, implementing and evaluating?

ماهي العناصر الرئيسية التي يجب ان تؤخذ في الحسبان وان يتعامل معها بعناية فائقة ولا بد ان تتوافر عندما نتوجه لإدارة العديد من مشاريع التقنية أو التفكير في عمل منهجية لإدارة هذه المشاريع قبل الدخول في مراحل التخطيط والتصميم وتوقيع العقود ومباشرة المشاريع وتقييمها؟

- e. In your opinion, how can organisations predict and respond to these aspects effectively and efficiently before the IT project intervention?

كيف تستطيع المنظمات التعامل مع الأشياء الضرورية في إدارة المشاريع التقنية وكيف تستطيع الاستجابة للتغيير وكيف تستطيع التنبؤ في مستقبل هذا التغيير بطريقة تتناسب مع متطلباتها؟

D15. In your opinion, what other factors are likely to influence the IT projects intervention in the organisation? Please explain?

ماهي العناصر التكنولوجية والاجتماعية التي تؤثر على مشاريع التقنية الجديدة عندما يتم ادخالها لمنظمة معينة؟ وماهو تأثيرها وكيف يتم التعامل معها؟

E. Knowledge Networks factors (environmental and critical)

E.1 Have any activities (e.g. promotion and awareness-raising, pilots and demonstrations, sponsorship, information and technical support, resource allocation, vendor support, consultant support and government support ... etc) been carried out by the government and/or other parties to encourage and support the uptake of Knowledge management, knowledge mobilisation and community of practice towards managing multiple IT projects? Please explain.

هل يوجد مبادرات من المنظمات (ترقيات- مكافآت- رفع الوعي-دراسات تجريبية-فحص وتحليل وتقييم- رعاة- استشارات- مصادر معرفية ومعلوماتية- خدمات للدعم الفني واللوجستي او مبادرات من الادارات العليا لدعم ادارة المعرفة و تحريك وتشغيل المعرفة وعمل بيئة معرفية من خلال مجتمع عملي لادارة المشاريع التقنية المستمرة؟

E1. Have you carried out any consultations with regard to managing IT projects?

هل لديكم مكتب استشارات او مرجعيات معينة لادارة مشاريع التقنية وهل تم تفعيلها بشكل عملي ولماذا؟

a. If yes, what impact did the consultants have on the IT projects?

E2. What are the roles of the vendors in supporting the IT projects? Please explain.

ماهي ادوار بائعين الانظمة التقنية وماهي ادوار مقدمين خدمات التقنية في المشاريع؟

E3. How does participation in IT project activities, either at intra-organisational or extra-organisational level? Please explain.

ماهي الالية التي يتم وضعها لتكون جزء من مشاريع التقنية في داخل المنظمة او من خارجها؟

E4. In your opinion, what other environmental factors are likely to influence the IT projects in the organisation?

في رأيك ماهي العناصر الرئيسية في ثقافة المنظمة التي تؤثر على مشاريع التقنية في المنظمات؟

a. In your opinion, what solutions can overcome other environmental barriers to enhance the success of an IT project and make it best practice?

في وجهة نظرك كيف نستطيع تجاوز عقبات ثقافة المنظمة حتى نستطيع زيادة نسب نجاح المشاريع التقنية وحتى نجعلها نموذجاً يمكن الرجوع اليه؟

E5. Which method does use to have “lessons learnt” from previous projects? Please explain?

ماهي المنهجية المعمول بها حتى نتعلم من الدروس السابقة في ادارة المشاريع هل يوجد نظام معين؟ لو سمحت اشرح؟

E6. Which systems are used for this purpose? And why?

E7. How important is to have project documentations for up-coming IT projects? Please explain?

في رأيك مامدى اهمية وجود نظام يساعدنا على حفظ ملفات المشاريع والرجوع له للمشاريع القادمة؟ اشرح لي؟

E8. How to learn from previous experience? Is there any practical examples?

كيف نتعلم من الماضي في ادارة المشاريع؟

E.9 What are methods used to enhance employees to contribute to share what they know? Who is responsible for documentation? What IT systems are used in this regards? How can you insure the quality of information and knowledge stored in your database?

ماهي الطرق المثلى لجعل الموظفين عوامل مساعدة في نشر المعرفة والتي تنعكس ايجابيا على ادارة المشاريع التقنية؟
ماهي الانظمة التقنية المستخدمة في ذلك وماادوارها؟ وهل يوجد قسم لتحليل المعلومات والتأكد من سلامتها حتى تكون
جاهزة في قاعدة بيانات المنظمة؟

E10. Who is responsible to make knowledge into active services and what are the methods used? Who is responsible to enhance knowledge used throughout IT projects? How can knowledge reach decision makers? Who can influence them? Do you have knowledge base systems?

من المسؤول عن وضع المعرفة او المعلومة الصحيحة حتى تكون خدمة فعلية؟ وماهي الطرق المعمول بها؟ وهل هي
فعالة؟ وهل يوجد طرق اخرى افضل؟ وكيف تصل المعرفة لصناع القرار؟ ومن يستطيع التأثير على القرار؟ هل لديكم
قاعدة بيانات معرفية ومامدى الاستفادة منها في صنع القرار؟

E11. How can you insure your targeted people with appropriate knowledge that is needed to enhance decision making?

كيف تستطيعون تحديد الاطراف المعنيين ومن ثم استيفاءهم بالمعرفة حتى تستطيعون تعزيز اتخاذ قرار مناسب؟ ماهي
الالية المتبعة وهل يوجد افضل؟

E12. How can you identify knowledge holders?

كيف تستطيعون معرفة من يعرف بخلفيات المنظمة ومن يعرف كيف تعمل المنظمة حتى يساعد في انجاح المشاريع التقنية؟
ماهي الطرق المعمول بها. وهل يوجد افضل؟

E13. Do you have defined knowledge networks?

هل يوجد لديكم شبكات معرفية من خلال الاشخاص او المنظمات؟ وماهي الالية المتبعة لتكوين تلك الشبكات وهل يوجد
انظمة متاحة؟

E14. How can you build knowledge networks to collect information and knowledge needed to enhance IT projects? What are the methods used in this regards?

كيف تستطيعون خلق شبكات معرفة تمكنكم من الوصول للمعلومة الصحيحة والمعرفة المطلوبة في مشاريع التقنية؟ ماهي الطرق المعمول بها وهل يوجد طرق اخرى افضل؟

E15. Who is responsible for making knowledge networks? How networks are important in IT projects? What are the challenges facing you in making knowledge networks? How knowledge networks are structured? Are they tangible or intangible? And why do you think?

من هو المسؤول في صنع شبكات المعرفة بين الاطراف المعنية في مشاريع التقنية ؟ هل هذه الشبكات مهمة في المشاريع؟ واين تكمن اهميتها ولماذا؟ وماهي التحديات التي تواجه العمل على خلق شبكات معرفية؟ وكيف يتم هيكلة شبكات المعرفة؟ هل هي متاحة لمن يريد ان يعرفها او هي تتشكل اجتماعيا بشكل غير ظاهر؟ ولماذا؟

Appendix D: Companies background

Company A: is one of the world's largest multi-national organisations offering professional services; it is also one of the world's largest accounting and business consultancy companies with its headquarters in the United Kingdom. Drawing on the knowledge and skills of more than 208K employees across 157 countries, it offers a variety of services including, but not limited to: business management; auditing assurance services; advice on tax, policy and the law; IT and consulting; transaction services; strategy, corporate finance and legal investment advisory services; business recovery; and human resource services.

Company A is a network of firms with 756 locations across the globe. It has been established in the region of the Gulf Cooperation Council (GCC) for 40 years, with more than 4,000 operations across the Middle East: in Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, the Palestinian territories, Qatar, Saudi Arabia, and the United Arab Emirates. It promises to deliver collective knowledge and experience via a channel of business networks in the fields of advisory services, assurance and tax, and business solutions. It is an internationally recognised large firm involved in solving complex business issues and measurably improving the ability of businesses to build value, manage risk and develop performance.

It has been shown to play a fundamental role in supporting public and private organisations in Saudi Arabia in particular and has been working as a business partner with Saudi organisations as auditors and business advisors, and in financial services and the banking industry, including major international banks. The Saudi Arabian General Investment Authority (SAGIA) recognised the company as a Knowledge Partner in the 100 Saudi Fast Growth awards.

Company B: is an international company located in Saudi Arabia. It networks globally with related firms to develop and make investments in national industries. It is one of the most prominent companies in Saudi Arabia to have made large-scale capital investment in desalination plants, free-zone ports, industrial estate development, and other key projects.

It has worked closely within a business group in different areas of the Red Sea gateway terminal. These include: trade and export development, water desalination, water services, support service operations, international water distribution, and technical services cooperation.

Its vision and objectives are to work closely with both public and private organisations in order to bring prosperity and develop services across various industries. It also operates across GCC countries to provide consultancy, advisory and support services by carrying out large-scale projects in different areas, such as water, energy, sewage, wastewater, IT and communications. It is recognised by the Saudi government as demonstrating the highest standards and efficiency in all aspects of business in order to obtain a top position in the relevant markets.

In relation to its IT practices, the company offers a variety of IT support services which include: infrastructure networking, programming and application development, operation and maintenance, ERP systems' implementation support, and data management systems. Some of its objectives in terms of its IT practices are to ensure the alignment of internal audit activities alongside corporate strategies, and compliance with corporate governance and audit committee policies, as well as to evaluate business processes.

Company C: Considered to be one of the national pioneer companies in Saudi Arabia with headquarters in Riyadh City, Company C was founded in 1983. LHZ offers various IT support services and has many branches across Saudi Arabia specialising in building and operating computer networks, developing and implementing software, and designing and maintaining applications and systems. The company is regarded as a medium-sized enterprise according to the categorisation of the Department for Business Innovation & Skills (2014). It provides IT solutions to its clients in both the public and private sectors, including designing and managing databases, facilitating business innovation, and leading multiple IT projects. It also offers a range of training services. These include, but are not limited to: IT and computer skills, essential skills for project management, computer languages, foreign languages, and essential skills for leadership and supervision.

The company has developed and successfully implemented more than 30 systems. These include: electronic transactions, equipment administration, operation and maintenance systems, electronic archive systems, and inventory and warehouse management systems.

Regarding local and international cooperation, the company is considered to be a strategic knowledge partner for public organisations and large international companies which operate in Saudi Arabia. Its positive cooperation in project management has improved its practices and increased its experience, thereby establishing it as a specialist company in IT project research

and development. It is now a source of knowledge for emerging local and international companies.

Company D: This joint-stock company was founded by the Public Investment Fund (PIF) in 1986 as a research and development company and, as such, this company has experience of IT practices over a long period. It has developed various e-services and high-profile government support projects, as well as building up national expertise and enhancing IT skills and practices across public organisations. Its mission to maintain the concept of a knowledge-based economy, has established it as a leading local company in knowledge management practices where IT is fundamental in bridging the gap between international and local expertise in IT business-related areas. In addition, it has developed several e-government systems that have been efficiently used and accredited.

It has recruited talented and skilled local people, and has offered investment opportunities to support and enhance its social capital and knowledge assets. Its scope of work includes, but is not limited to: technical, consultation and support services; services' integration; business modelling and process evaluation; project implementation; and advisory and consulting services.

The company's strategic aim is to maintain long-running relationships with classified vendors and business partners; these relationships are based on values designed to create a better community of practices in a healthy competitive environment.

Company E: The e-Government Project Centre began the implementation of a national e-Government program in 1998 and, since then, the government of the Kingdom of Saudi Arabia has made significant efforts to transform its systems and processes to e-Government, seeing such a concept as a great benefit to the national economy.

This program was developed through the cooperative efforts of the Ministry of Finance, which was instructed to proceed with the establishment of an e-Government program, and the Ministry of Communication and Information Technology (MCIT), which was given responsibility for the management, planning and development of the CIT sector. This included launching e-Government and taking responsibility for establishing a plan to deliver e-Government services, as well as the procurement of the necessary resources.

Understanding that it was necessary to collaborate and join forces with several areas to transform the Kingdom into an information society, MCIT, in partnership with the Ministry of Finance and the Communication and Information Technology Commission, developed the e-Government Program (YESSER) in 2005. The Program is controlled by a higher supervisory committee consisting of the Minister of Finance, the Minister of MCIT, and the Governor of the CIT Commission. A steering committee evolved from the higher committee with members representing the Ministry of Finance, MCIT and the CIT Commission, in addition to the Program's Director General.

In spite of the vision of the Yesser Program, which was to ensure transformation to e-Government in Saudi Arabia by 2010, an in-depth analysis of the rate of adoption and the progress of the implementation showed that only basic e-Government services have been implemented so far (Alshehri, Drew & Alfarraj, 2012). Various studies, such as those of Alshehri et al. (2012) and Alshehri & Drew (2010), suggest that the slow rate of adoption and implementation of e-Government is because of various challenges and obstacles, most of which are related to organisational issues and a lack of expertise.

The Yesser Program aims to benefit government agencies by providing e-business interactions and communications, as well as by providing services for individuals, whether they are working in such organisations or are ordinary users of public services. The Program is considered to be the hub of public organisations where its role is to consult, lead, monitor and legalise practices and usage in IT projects.

Company F: was first founded under the name of 'Saudi Communications' but was then assigned new tasks relating to Information Technology.

The vision statement of the company F is: "Advance the communications and information technology sector through regulation to achieve a highly competitive environment for the provision of superior services to end-users and an attractive ecosystem for investors."

The Company F has the judicial and financial independence to attain the objectives required of it in the Telecommunications Act while the Saudi Government has emphasised the importance of keeping pace with the rapid developments in the field of telecommunications at an international level since this growth has created fundamental changes in the infrastructure and

regulations of the telecommunications sector in the Kingdom. This has necessitated regulatory changes in terms of the competitive and investment environments of this sector.

Because of the importance of the role of Information Technology and the successive developments in the world of telecommunications, the Commission has been entrusted with new tasks relating to Information Technology; the Commission's Ordinance has been amended to be consistent with the new name, with new tasks being added as stipulated in the Ordinance.

Company G: is one of the main information society companies in the country. It is managed by the government and has implemented several large-scale IT projects across public agencies. It also offers many online services provided by the Ministry and its different sectors.

The company has been actively collaborating with both the private and public sectors, and local and international companies, to advance its practices and services in technology. Regarding knowledge management and advanced IT project management practices, it has established a number of initiatives and has brought in local and international experts to contribute to its mission and vision.

Appendix E: The codes extracted to generate the sub-themes and main themes for analysing the findings

Table E 1: The codes extracted to generate the sub-themes and main themes for analysing the findings

Codes	Sub-Themes	Themes
<p>“Business has a consistent documented approach to strategic planning and development which sets out the future activities for all aspects of the organisation and covers all major organisational units.”</p> <p>“Regular reviews are performed at fixed time intervals allowing IT to be incorporated more formally into the planning cycle. Major IT opportunities are input to the strategy”</p> <p>“Competitor and trading partner strategies are considered, where appropriate. Planning is driven by organisation unit departmental heads forcing IT to discuss and negotiate on key IT issues independently with each department.”</p> <p>“Business has a robust strategy and plan which are regularly and consistently reviewed for all business units.”</p> <p>“No responsibility for such architecture, other than infrastructure. Architecture evolves largely based on the experience of individual managers in the IT function and reference to peer organisations.”</p> <p>“An informal collection of guidance / policy documents is in place for certain aspects of data management, but no umbrella strategy is in place.”</p> <p>“There is a clearly defined formal strategy that covers all aspects of the organisation.”</p> <p>“All development projects and technical system designs are based on an up-to-date, formal, technology selection process with input from documented requirements analysis.”</p> <p>“Output is a documented selection rationale with objective measures, analysis and review against the IT strategy and technical architectures.”</p>	<p>Organisational strategy,</p> <p>Organisational culture,</p> <p>Organisational capacity and structure.</p>	<p>Organisational factors</p>
<p>“Suppliers are intuitively managed during projects and are kept at arm’s length from projects and their management processes.”</p> <p>“Causes include: absence of contracts; poorly defined (ambiguous, high level, generic or badly structured) contracts; lack of consistency with project plan (or the set of activities within the project if no plan); lack of supplier relationship management to facilitate collaborative behaviours; inappropriate relationship development (e.g. the internal supplier manager becomes too familiar/"cosy" with</p>		

<p>the supplier or is compromised or confused by the supplier's own relationship management activities).”</p> <p>“Issues are understood, but there is no prior awareness of where changes are relevant to IT.”</p> <p>“IT has no involvement in setting wider company policies for the areas related to IT. It is dependent on systems and their changes, such as data quality, information management, funding/approval, change management. These areas are seen purely as business issues and IT takes no proactive action to drive decisions on these issues.”</p>		
<p>“Reorganisations are typically focused on IT senior management, generally increasing numbers of management positions, group technical/functional specialisations and levels in the hierarchy.”</p> <p>“The IT organisational structure is largely product- or technology-driven.”</p> <p>“Regular reviews of IT organisation/management structures use, for example, brainstorming techniques to ensure clarity, consistency and coverage of roles and responsibilities.”</p> <p>“Lack of formal IT structure; generic ‘IT specialist’ roles/groups throughout the enterprise. Exposure from high dependence on individuals’ knowledge of particular technologies or systems.”</p> <p>“Shift to project-driven IT structure, multi-disciplinary IT teams of analysts/designers/programmers being assembled by project resource/skill/experience needs.”</p> <p>“Ensures there is little or no exposure to risk from dependence on individuals.”</p> <p>“Development groups align with business functions. The majority of the IT organisations focus on delivering services and the organisational structure reflects this by grouping into customer aligned areas.”</p> <p>“Established culture of continuous service improvement.”</p>		
<p>“Breadth and depth of experience sufficient to demonstrably fulfil IT mission, objectives and strategy.”</p> <p>“Majority of IT people possess mature business and technical understanding in critical service/technology areas.”</p> <p>“Programme management and service management competencies established.”</p> <p>“Formal gap analysis between existing culture and cultural characteristics required to conduct effective knowledge management.”</p> <p>“Strategies identified to achieve cultural characteristics that enable effective knowledge management.”</p>	<p>Routinising knowledge networks activities</p> <p>Routinising organisational business activities</p>	<p>Knowledge networks environmental and critical factors</p>

<p>“Cultural barriers identified and addressed through a cultural change management plan.”</p> <p>“Some knowledge sharing occurs with trading partners.”</p> <p>“Formal identification of both codified and tacit knowledge sources within the organisation.”</p> <p>“Codified knowledge sources include: electronic documents, e-mail, GroupWare databases, data warehouse, paper files and scanned images.”</p> <p>“Tacit knowledge sources include: subject matter experts and specialist skills/expertise.”</p> <p>“Knowledge sources are restricted to those within the organisation. Some recognition at staff appraisal time of knowledge contribution but inconsistently applied.”</p> <p>“No formal evaluation of the cultural change required for knowledge management.”</p> <p>“The culture encourages knowledge hoarding rather than sharing.”</p> <p>“Information and knowledge access largely via trial and error.”</p> <p>“Public organisations are not willing to cooperate with internal management and that’s why they rely on outsourcing companies to do their work.” “It is a matter of the complex culture.”</p> <p>“To implement an IT system after some delay due to the lack of cooperation inside the organisation with the project’s team.”</p> <p>“It was managed internally and had been handed to us after there were delays.”</p> <p>“That is why I think there is always need for outsourcing.”</p> <p>“The IT organisation is structured only to deliver technology to the end user and has no service provision capability.”</p> <p>“Some elements of the IT function (e.g. Helpdesk) are structured to provide a level of service to the business customer community.”</p> <p>“There may be some coordination between development and production but there are few real end-to-end support functions or post implementation services for business customers.”</p> <p>“Assessment of demand is informal and carried out with departments.”</p> <p>“The approach is to prioritise user demand to ensure the allocation of resources to demand is appropriate.”</p> <p>“The roles are not always allocated to appropriate departments and individuals.”</p> <p>“Staff are assigned responsibility for reviews but these may be conducted inconsistently against incomplete standards.”</p>		
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<p>“Limited Senior Management support may still result in quality being sacrificed to constraints”.</p> <p>“Quality assurance reviews are conducted against standards; there is little focus on delivery to specification/quality needs.”</p> <p>“The IT leadership and culture recognise the importance of benefits’ realisation and this view extends to some project managers but there is a lack of robust, systematic support within the IT function for benefits’ management.”</p> <p>“The culture within most projects is product- rather than benefits-focused.”</p>		
<p>“Private local organisations are our strategic partners in terms of building knowledge sharing communities, enhancing our business practices in such areas, engaging them in some complex projects and sharing best practice.”</p> <p>“These multicultural communities provide chances for exchanging expertise and bridging the way to local markets.”</p> <p>“We have some classification for private local companies based on their historical records in cooperating with us.”</p> <p>“Statements of experience are maintained to support project work.”</p> <p>Skills matching is completed with staff selected to either work on a bid or project/service itself to ensure that appropriate skills are utilised.”</p> <p>“Various members of IT management/staff deal with users/customers/trading partners in an uncoordinated/inconsistent manner.”</p> <p>“The need for a more formal approach to customer management is recognised.”</p> <p>“Some business analysts and/or IT managers have functional areas assigned to them to develop relationships and business understanding.”</p> <p>“No monitoring or measurement takes place on the success of these limited relationships.”</p> <p>“The enterprise has a formalised rather than ad-hoc approach for researching relevant information and preparing the IT decision support data.”</p>	<p>Knowledge Networks Externalities, Internal factors, External factors, Customer management, Communication management, Knowledge intermediaries</p>	<p>Factors influencing knowledge channels</p>
<p>“The need for greater formality is recognised in defining end to end validation of an IT solution's ability to function to specification in the operational environment through testing and proving; this includes test scripts and plans.”</p> <p>“Procedures may be written defining internal best practice but they are used inconsistently.”</p> <p>“A typical configuration may be built for testing purposes for some key/major projects with a significant hardware component.”</p>	<p>Resources Tools System Authorities</p>	<p>Knowledge management infrastructure</p>

<p>“Some ad-hoc proving of the whole solution (infrastructure and application) may be done based on experience.”</p> <p>“The IT function has to be fully discussed with the business, and must address their requirements for applications availability; it also has to be mapped back to the underlying infrastructure to understand the dependencies on which it is based.”</p> <p>“All major/key projects start with formally committed staff and have a rational validated estimate and plan based on guidelines, the estimate model and the availability of specified staff.”</p> <p>“Plans are revised for major changes and actively used by Project Managers.”</p> <p>“Project management software is used effectively to prepare/document/maintain plans.”</p> <p>“The project structure and infrastructure are understood at the time of estimating.”</p> <p>“Having a solid knowledge infrastructure, alongside the knowledge base, allows for standardisation in IT project advertising, marketing, innovating, implementing and evaluation.”</p>		
<p>“Basic assessment of all projects after initiation, basic business cases used.”</p> <p>“Some projects reviewed jointly between business and IT.”</p> <p>“Some degree of formal project ownership and sponsorship but no significant re-evaluation after project’s start or continuation for benefits or priority against other projects.”</p> <p>“Ongoing prioritisation is mostly subjective.”</p> <p>“Formal project briefs are prepared for all projects with consistency and rigour prior to project initiation and with alignment to any programme or organisation level blueprint.”</p> <p>“Scope is specified clearly, referencing a matrix of dimensions.”</p> <p>“Project briefs are prepared for the entire business change project and the objectives, scope, deliverables and constraints for IT work packages.”</p> <p>“Project briefs are agreed by the project board and assigned to a business change project manager who also agrees IT work package definitions with the IT project manager.”</p> <p>“Identify key documents to resolve problems productively.”</p> <p>“Approach is updated on a continual basis to ensure relevancy with best practice and experience.”</p>	<p>Innovation, planning & evaluation; implementing, extending, continuously managing, and structuring.</p>	<p>Knowledge networks’ initiation in IT projects</p>

Table E 2: Sample interview extract connect to main construct from the case study reports

Main construct	Sample interview extract connect to that construct
Organisational factors	We always make sure that all divisions and units are in alignment with the overall organisational strategy by updating our websites weekly, producing division or unity reports monthly and sharing the organisational strategy across the organisation, this it to have the buy-in from people. Working in multicultural company we should understands the need of employees to meet it; which is a core part of our organisational strategy. This approach enhances the organisational readiness and facilitates resources allocations.
Knowledge networks initiation in IT projects	The first step to create a strategic knowledge network is to have a support from the top management and to introduce knowledge networks strategies within the organisational strategy. This needs a specific department of knowledge management which is in charge of allocating knowledge management activities, evaluating knowledge management infrastructure, creating vision and missions and chasing knowledge management activities within the organisation and across the border. The knowledge management office has to work cooperatively with all divisions or units within the organisation and whoever could involve in IT projects.
Factors influencing knowledge channels	When knowledge networks are not explicitly defined; not clearly identified in terms of their scope, boundary and allocations; and not highly supported from top management; they won't be efficient.
Knowledge networks factors (environmental and critical)	We introduced financial incentives plus top management acknowledgement certificate, for example whoever we send to an international conference in specific area that we demand further knowledge from, we require the person to absorb as much information as possible from the conference to present what he or she got in front of our employees; in addition to collecting contacts from the experts who attended the conference. Those experts will be called by our organisation and invited to establish relationship.

Main construct	Sample interview extract connect to that construct
Knowledge management infrastructure	<p>Knowledge networks have to be updated, re-evaluated and explicitly presented. Such rewards, awareness rising, trust, top management support, knowledge management strategies and assistive tools are crucial.</p> <p>Some ad-hoc proving of whole solution (infrastructure and application) may be done based on experience. Having a solid knowledge infrastructure alongside knowledge base allows having a standardisation in IT project advertising, marketing, innovating, implementing and evaluation.</p>

Table E 3: A 15 Point Checklist of Criteria for Good Thematic Analysis (Braun & Clarke, 2006, p.36)

Process	No.	Criteria
Transcription	1	The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for ‘accuracy’.
Coding	2	Each data item has been given equal attention in the coding process.
	3	Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive.
	4	All relevant extracts for all each theme have been collated.
	5	Themes have been checked against each other and back to the original data set.
	6	Themes are internally coherent, consistent, and distinctive.
Analysis	7	Data have been analysed – interpreted, made sense of - rather than just paraphrased or described.
	8	Analysis and data match each other – the extracts illustrate the analytic claims.
	9	Analysis tells a convincing and well-organised story about the data and topic.
	10	A good balance between analytic narrative and illustrative extracts is provided.
Overall	11	Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly.
Written report	12	The assumptions about, and specific approach to, thematic analysis are clearly explicated.
	13	There is a good fit between what you claim you do, and what you show you have done – i.e., described method and reported analysis are consistent.
	14	The language and concepts used in the report are consistent with the epistemological position of the analysis.
	15	The researcher is positioned as <i>active</i> in the research process; themes do not just ‘emerge’.

Appendix F: Case studies in the role of networks, networking and knowledge

Table F 1: Summary of two case studies in the role of networking, network and knowledge (Source Hislop et al., 2000).

	Case study 1	Case study 2
Advantages and contribution	This study has brought the issues of politic involved in the role of networks, networking and knowledge. This study places an emphasis on the role of networks/networking and utilization of knowledge in the political process in IT implementation and innovation.	
Addressed issue/s	The central focus of this research is to address issues related to possession, control and utilization of knowledge and also consider the development and use of intra and extra-organisational networks. These can be utilized as resources in the process of the introduction of change. The advantage of this work is to allow examining the dynamics and the role of networks and knowledge in IT based innovation.	
Organisations names	Pharma-co	Cast-co
Type of industry	International pharmaceutical business	international casting and injection moulding business
Summary of the case	Concerned with development and production of nuclear medicine, Pahrma-co is a UK company, is one division of about 12 in an international pharmaceutical business. It has been changed to private company in 1980s, and before it was linked to corporate centre. Since this change, the strategy has been focused on commercially and cost-sensitive culture, replacing its historical culture during many change programs introduced. There was a need to introduce ERP system to their business to improve their competitiveness internationally for their production facilities. For this introduction, too much arguments occurred, no external consultants or advisors involved in at this stage. Change therefore was developed and outlined internally. Some recruitment was made by the company; the World Manufacturing director (WMD) had been recently recruited and significantly was one of the chief architects of the ERP project that strongly championed ERP project. For their commercial strategy, they recruited a new senior manager with relevance experience to “key” senior position. The recent WMD has limited experience working within the company, but his commercial knowledge is so high. However, middle management resists the change due to their predominant traditional culture of being regarded around production functions as a key success for the company alongside rich of knowledge in this area. On-going argument had been faced with a strong position of WMD and project teams whilst a new layer of senior management was against traditional technical culture. Thus, the production teams lost their value and the company decided to exclude	It has over 40 separate divisions globally (Europe, Asia and the Americas). Historically, those divisions have very little interactions with each other, and corporate centre plays the role in holding the company. Integration between those divisions was seen to be important to introduce ERP system to have a standard financial report; and this was emphasised by finance director at the corporate centre to save time. However, the culture was an obstacle to implement a single system, because of the traditional way how they use their IT systems separately in the divisions and regions as well as their traditional structure. Additionally, corporate centre was managing divisional and regional in such “hand off” way. The company staff lack of IT skills. Therefore IT outsourcing was brought to give advice, and brought staff from divisions and regional to discuss the issue, however resistance was seen by holding their tacit knowledge of

	<p>senior manufacturing management from the early decision making process shaping the change. However, the project team showed some resistance. The reason why they were excluded is to prevent this resistance that was inherited from the old system alongside their lack of knowledge of commercial production technique, despite their deemed necessity in designing the change program. Instead, a small sample was selected to design the change based on their knowledge and experience in introducing change. However, this selected group found important to involve the lower level production management, and direct production staff within the process mapping trail since senior level was excluded. The involved group was told about process mapping to be related to quality assurance certification. They were involved because of their tacit knowledge in codifying and formalising internal production procedures which was need in designing the change programme. At this stage the project was successful, but the lack of cross functional network was an obstacle to the ERP project causing failure. This because senior managers were not involved and disregard in the decision making.</p>	<p>the divisions' businesses (customers, technical systems, manufacturing processes). Corporate management's relative lack of detailed, divisional, business knowledge made challenging this argument difficult. The explicit knowledge was not available due to the lack of codifying knowledge. Consequently, organizational knowledge through Cast-co was highly disseminated, fragmented and tacit. The outsourcing consultant lack of networks within the company made it difficult to gather people resource, besides corporate centre lacks this networks within staff. So the Cast-co was not being able to introduce this system.</p>
Findings	<p>Interlinked relationship between knowledge, power and networks during change. The theory indicates that the location of management within organisational division of worker utilise the level of formality, hierarchical authority and brings an element of controlling over each other. Hierarchal authority played a fundamental role the implementation and the dynamics of change processes cannot be completely understood when neglecting organisational hierarchical structure. Formal authority seemed to be considered more a legitimate in Pharma-co than in Cast-co. the differences is that in pharma senior management was powerful in preventing the change proposed, however, in Cast-co was the power of regional division culture over the level of management. In both cases, the ignorance of tacit knowledge caused the failure. In Pharma-co the change was successful in the early stage and failed later, however, in Cast-co the change could not be introduced. In both cases network and knowledge played fundamental roles. The implementation of change appears to be mediated within intra-organizational politics, making the outcome of such processes unpredictable.</p>	